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SEPTEMBER 1, 1997

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A Positive Balance

How Two
Rival Boston Banks
Merged Their
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Bank of Boston CTO
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saw clearly the
investment value of
BayBanks' retail IT

ALSO INSIDE Euro Woes

Struggling with
year 2000 issues?
Imagine changing
currencies at the
same time...

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Boston



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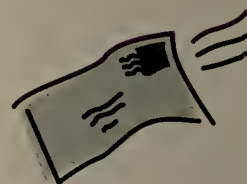
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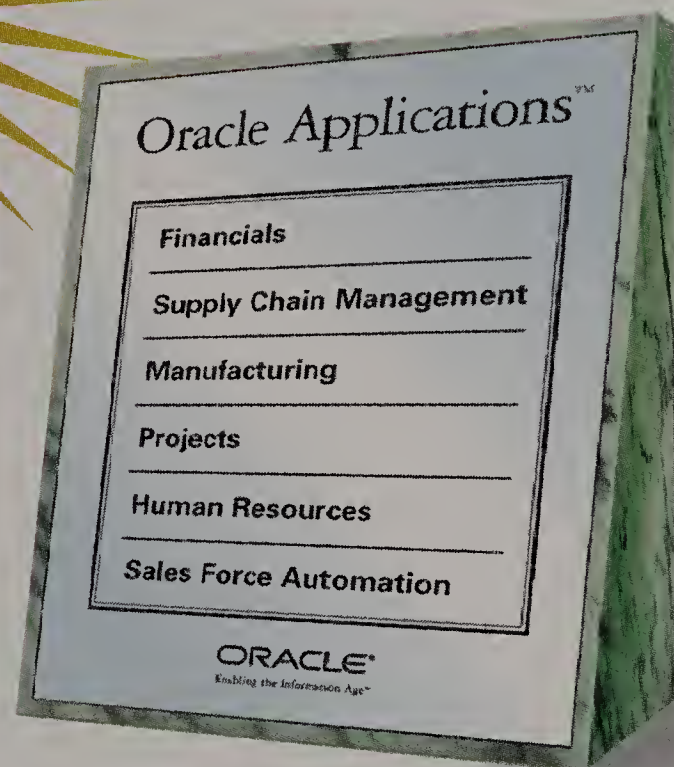
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CIO Editorial Director Lew McCreary and VP of Technology Tim Horgan are featured on **American Airlines Flighttalk**. In a roundtable discussion with Ron Gollobin, a reporter with WCVB-TV Channel 5 in Boston, McCreary and Horgan share insights on Web business opportunities and advantages, making technology choices, the increasing value of CIOs and the changing ways we do business.

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In Box

LETTER FROM THE EDITOR AND READER FEEDBACK

It's the end of July as I write this, and I'm in the middle of my vacation. Well, sort of on hiatus from it for a few days. I went up to the woods of Maine with my family

last week; they stayed while I came back to civilization to attend to a few things. All told, I'll spend 10 or 12 days up there, in what I consider paradise.

It is an amazing place, an hour or so northeast of Bangor in the heart of timber country. The cabin is on a six-mile-long lake filled with forested islands. A bald eagle nests there. We'll see deer, moose, beaver, mink, loons and hawks during the next two weeks. Catch bass, perch and sunfish (the sunfish live under the

dock and practically jump into your net). A family of mallards comes by for handouts a couple of times a day. My kids swim with the ducklings.

There are no power lines going in to the lake. No phone lines. (By now you probably have some idea why I call it paradise.) It's enforced disconnection from work—something I hold critical not only to my sanity in these times of hyperconnectivity but to my ability to perform at my best the rest of the year. When I really get a break, I decompress. This enables me to gain perspective, balance. But it occurred to me the other day: It's unfortunate that many of us actually have to go to a place where you can't connect in order not to.

For me to check in with the office (and I will, but only once or twice), I have to drive along the dirt road three or four miles till my cell phone picks up a signal or trek to the nearest pay phone, at the general store in Burlington, about a 20-minute drive. E-mail is out of the question. In fact, I'm not even taking my computer. Now that I receive an average 100 messages a day, being without a computer fills me with the most tremendous sense of freedom.

Disconnecting is a luxury. For me it's also a necessity. I hope you had the chance to disconnect this summer, too.

Abbie Lundberg
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IN THE CARDS

If you want to talk about the technical advances made in casinos and splash Steve Vollmer [IS director of New York-New York Hotel and Casino in Las Vegas] on the cover showing a royal

flush [July 1997], he needs to show his "straight flush" in spades—the only royal flush in poker (unless they changed the game and hand names).

Armand Norelli

armand.norelli@internetmci.com

Here's what According to Hoyle, by Richard L. Frey, says on the subject: "Straight flush...consists of five cards in suit and sequence, with the ace ranking either high or low: [shows a diamond symbol] A-K-Q-J-10 (the highest possible hand, also called a royal flush)."

THE PROBLEM OF THE YEAR

I am troubled by the underlying assumption Thomas Oleson seems to make [in his June 15, 1997, article "The Sky Is Not Falling"] that the year 2000 problem is only about financial and business-related systems. Nothing could be further from the truth. Moreover, even a single year-2000-related failure of a date-sensitive

process control application in a chemical factory, power generation facility, water and sewage treatment operation, or nuclear plant could result in far more than a disruption of services—the result could be death and destruction. And it doesn't take a massive system shutdown to cause a lot of problems either—it was a less than two-minute failure of a single valve in a chemical plant in Bopal, India, that killed more than 1,000 people and injured many others. It is important that the IS profession face up to the whole year 2000 problem and not just the parts we are most comfortable with.

Leon A. Kappelman

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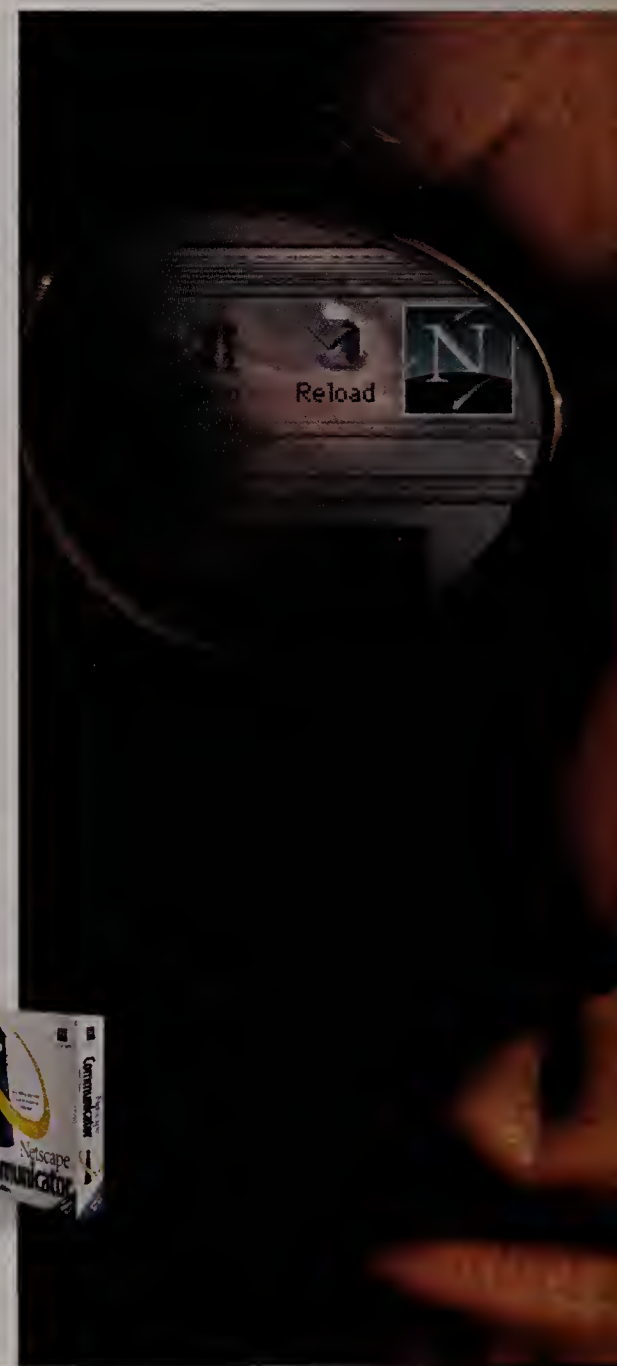
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Your editor's letter on the year 2000 is right on point; there are far too many who have yet to wake up and smell the coffee on this one.

In Nebraska state government, we seem to be getting a considerable amount of attention for having a solid approach to the problem. Our data center deserves a good share of the credit for having the foresight to conduct a scoping study in 1995, resulting in a cost estimate landing on the governor's desk late that year.

We were able to convince the governor and legislative leadership of the mission-critical nature of the problem to the point where they approved a policy framework and funding in 1996. We are underway and plan to be completed by January 1, 1999.

The most difficult aspect of the year 2000 problem is convincing top management that the issue is real. Our success with the governor and legislature

did not come without considerable marketing, answering questions and suffering through assaults based on the lack of "business value."

Two things we found particularly

valuable: First, major Nebraska businesses, including Union Pacific and First Data Corporation, were willing to say on their letterhead that yes, this is a big problem, we are wrestling with it also, and the state needs to step up to it. The second was pulling some actual code and pointing to the line where, if "00" is read, the program abends. This one happened to be the state's income tax system.

The CEO (who, in our case, is the governor) needs to see real, hard evidence of the business risks in order to be convinced that the large investment is necessary. This can be very challenging for the CIO because the measure of success is that nobody notices when the project is complete.

Rod Armstrong

State Information Technology Coordinator

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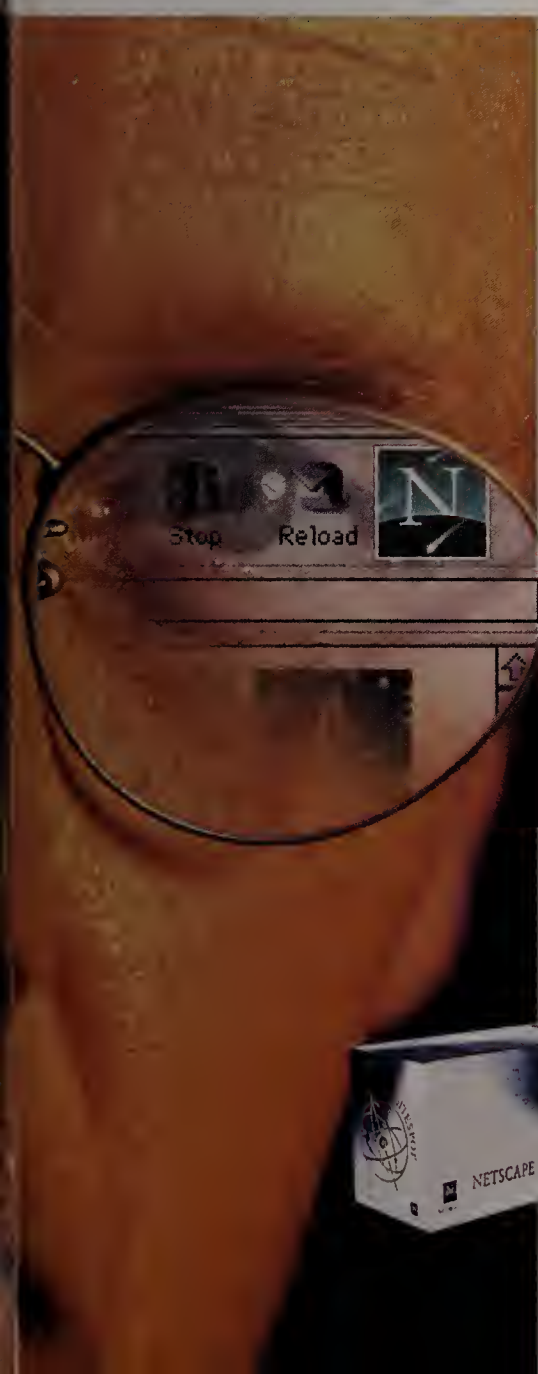
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Publisher's Note

What keeps you awake at night?

We continue to ask our readers this question so that we can deliver the most important and timely information to our audience. We continue to hear the same two responses—business use of the Internet and profitability through enterprisewide collaboration.

We asked. We listened. And now we are ready to respond. I am very pleased to announce that on Oct. 1 *CIO* will debut a new editorial concept. *CIO* magazine will be published in two separate sections, conveniently delivered to you in a polybag. The first part of *CIO* will continue to

address the wide range of technology issues we have brought you for the past 10 years. The second part of *CIO* will alternate between a Web business focus and an enterprise focus.

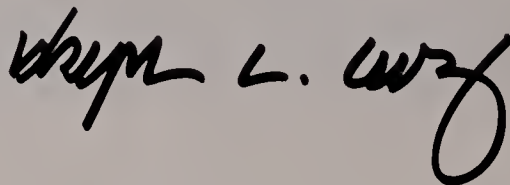
With the issue that mails on the first of the month, you will receive *CIO Web Business*. Strategic use of the Internet requires the expertise of seasoned executives with the vision to create new business applications and the clout to purchase the products and services required to carry out that vision. *CIO Web Business* will include real-world case studies, interviews with business leaders and reports on the technology solutions

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I hope you enjoy the enhancements we're making to *CIO*. Please share your opinion of the new format starting with the Oct. 1 issue. Send e-mail to jlevy@cio.com.



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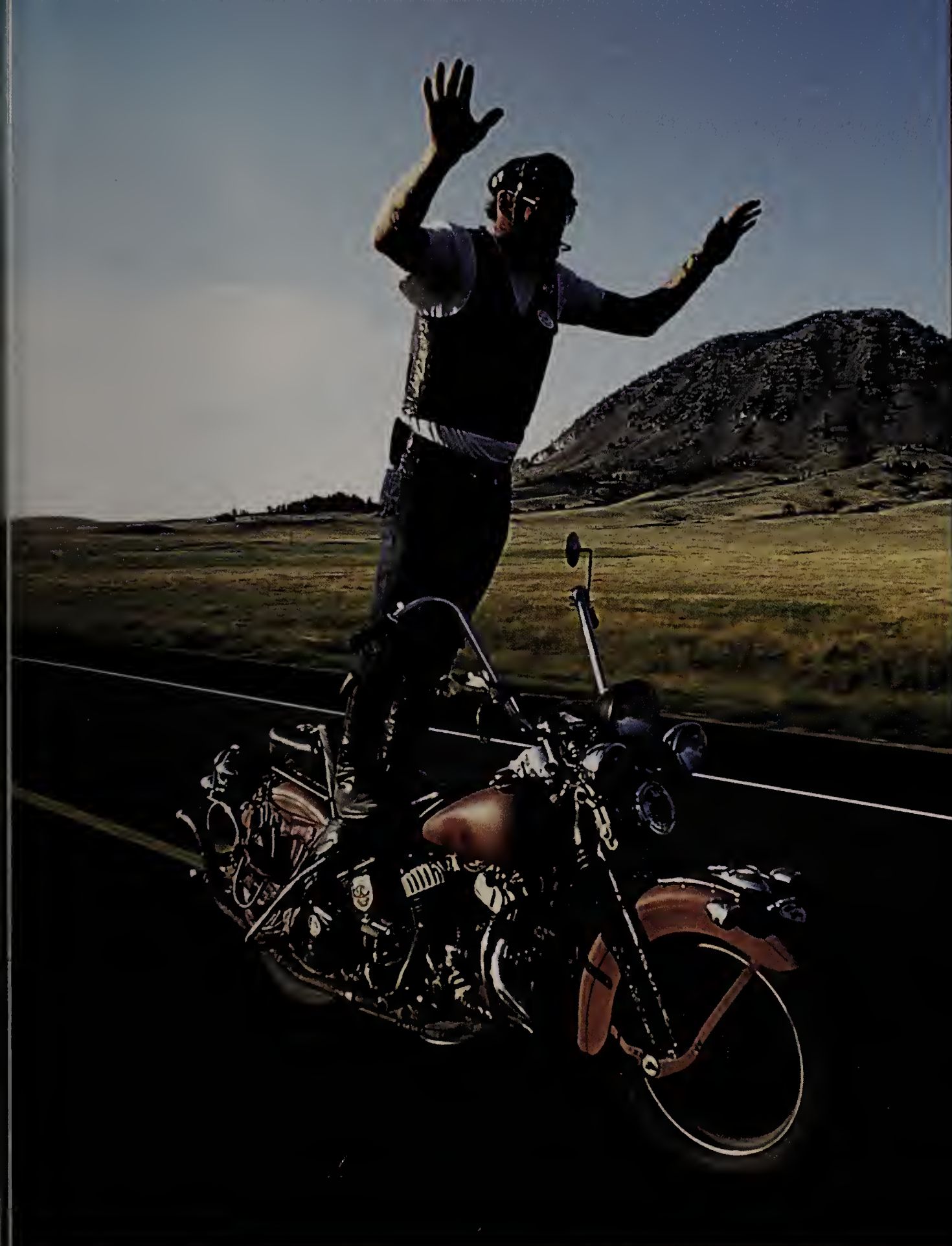
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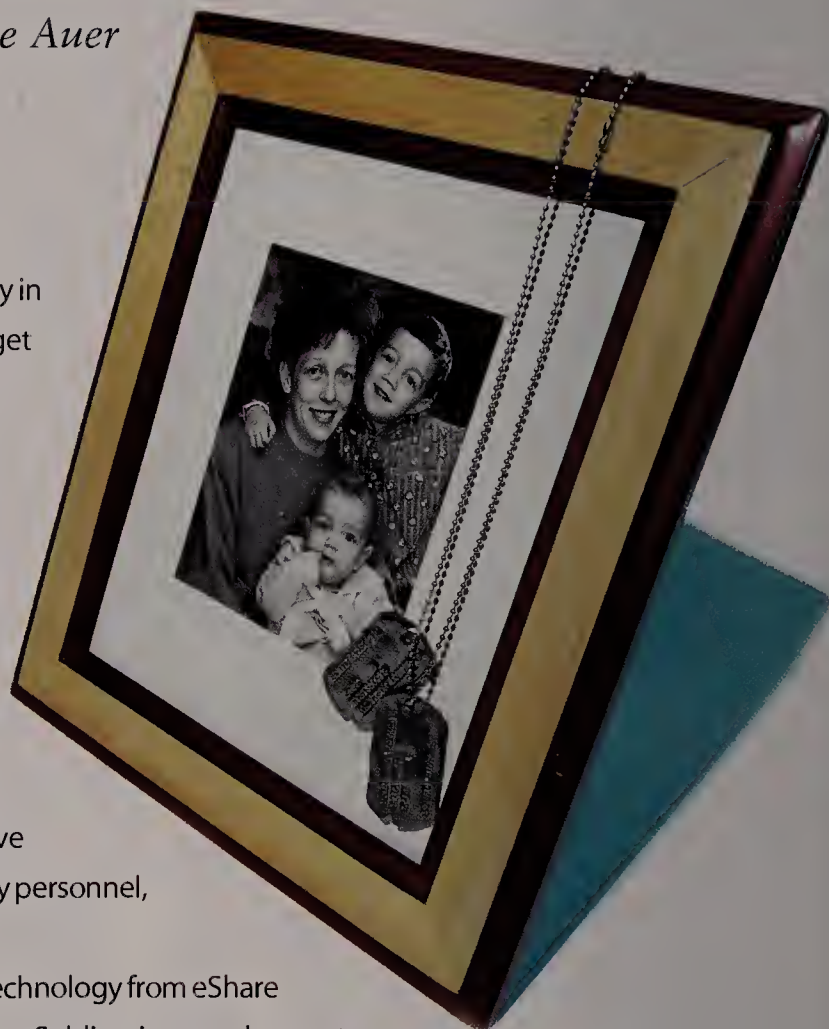
Edited by Katherine Auer

Soldiers' Solace

MILITARY NETWORK Having served as a marine during the Vietnam War, Robert "Gunny" Hiles knows all too well how lonely fighting for life and country in a jungle halfway across the world can be. Even now, decades later, he can't forget his wartime memories of isolation and despair. That's why in 1996 he decided to harness the Internet technology he works with as an engineer at Internet and telecommunications service company Charter Communications International Inc. to make life in the trenches a little less bleak for soldiers.

With the help of fellow Charter employee and former U.S. Army and Naval Reserve member Dale R. Smith, Hiles created the Military Network (www.military-network.com) as a sort of oasis for past and present military personnel and their families. The site features resources and links to other sites on such topics as tanks, guns, medals, pay and benefits, as well as links to recreational areas around the world. Because most military installations have computers with Internet connectivity, the network is accessible to most military personnel, Hiles says. More than 2,000 people visit the Military Network each day.

The chat and bulletin board component of the Military Network, based on technology from eShare Technologies Inc., connects military personnel with their loved ones back home. Soldiers in even the most inhospitable locations can hop online for a restorative chat. "Say you are a U.S. Marine based in an overseas hot spot



Bridging the Gap

WOMEN AND TECHNOLOGY Nevermind power suits and affirmative action; for many women, the key to achieving success in the workplace may be technology. Seventy percent of women see technology as an equalizer on the economic playing field, according to a national survey of 400 working women conducted by independent polling firm Penn, Schoen & Berland for Avon Products Inc., the cosmetics company. Eighty percent, the survey found, cite technology as the key factor contributing to higher salaries.

Among the women surveyed for the study, about 80 percent view technological proficiency as their entree into traditionally male-dominated fields like IT, and three-fourths of the respondents attributed recent job advancements to



their use of and familiarity with technology. The study also indicated that professional women in high-ranking positions (those who earn more than \$45,000 annually) are likely to be heavy computer users.

The results of this survey shouldn't surprise women. It indicated they are already aware of how technology can aid in their own career advancement. Eighty percent said it is impossible to move forward in one's career without knowing how to use technology, and 73 percent said technology had helped them achieve professional goals that otherwise would have been unattainable. ■

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Trendlines

like Bosnia," says Hiles. "Talking to your partner and family over temporary long distance lines takes a significant chunk from your paycheck. Now, eShare, in conjunction with the Military Network, provides an affordable method to connect with your loved ones."

Another benefit that the Military Network's chat rooms offer is the chance for members of the U.S. Armed Forces to interact with a community of peers. "Say you served in Vietnam," says Smith, who serves as senior editor for the Military Network. "To physically arrange a reunion might not be feasible, especially on a regular basis. eShare and the Military Network will provide you with a forum to both maintain regular relations with fellow unit members and track down long-lost former colleagues in the Armed Forces."

According to Hiles, the Military Network has even helped save the life of a military doctor stationed in Vietnam who was contemplating suicide earlier this year. As a last-ditch cry for help, the doctor posted a message on the Military Network and received so many caring responses that he checked himself into a hospital.

Hiles himself, suffering from "survivor's guilt," has found the site's chat capability invaluable. Being able to communicate with people who share his feelings is very healing, he says. "We get together and talk it through," he says. "We're among others like us, so we feel comfortable."

—Jennifer Bresnahan

They May Come, But They Won't Pay

INTERNET GAMING If you're hoping consumers will cough up gobs of money to become members of your fancy-schmancy subscription-based Web site, you may want to think again. "Internet Games," a recent study by Cambridge, Mass.-based Forrester Research Inc., concludes that online gaming, the next great hope for the subscription-based Web business model, is falling far short of expectations, and analyst Seema Chowdhury says the findings are "another nail in the coffin for subscription services."

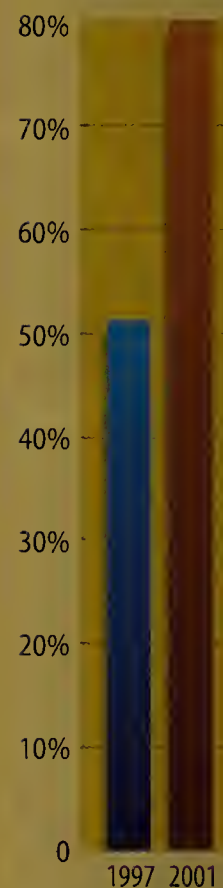
Forrester pegs consumer membership in subscription-based Internet gaming services—sites such as TEN, the Total Entertainment Network, through which players can vie with opponents—at around 600,000. That number will only double by the year 2001, a growth rate that's far too slow. "We've watched their membership lists for six to eight months, and we see them growing by hundreds, not by the thousands they need to make this a viable business," says Chowdhury.

While game manufacturers continue to develop online versions of their titles, the report forecasts the rise of online gaming centers that rely on advertising revenues rather than membership fees. Right now, advertising accounts for about 51 percent of online gaming revenues; by 2001, Forrester expects that figure to rise to more than 80 percent.

To obtain a copy of "Internet Games," call Forrester at 617 497-7090. ■

Adding Up

Advertising as a percentage of online gaming revenues



SOURCE: FORRESTER RESEARCH INC.



A Good Day To Stay In Bed

YEAR 2000 Imagine it's Jan. 1, 2000. You've been celebrating the dawn of the new millennium at a party on the top floor of a 52-story skyscraper, but now you're exhausted; it's time to go home. You enter the lobby and wait for the elevator. And wait. And wait.

Unfortunately for you, this is no ordinary wait for a slow lift. Believing it is now the year 1900, the elevator's embedded microchip—which is used to ensure regular maintenance checkups—thinks the elevator needs service and takes it out of commission until it gets some. The result? You've got a long walk down.

Indeed, the year 2000 problem, best known for the impact it will have on unprepared computers, has the potential to create a lot more chaos than was originally

imagined. Microchips embedded in a wide range of electronic devices could also be affected. "Consider how many technologies with such chips touch our daily

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Trendlines

lives: everything from fax machines to sprinkler systems, from pacemakers to elevators, and from manufacturing process control systems to military messaging systems. The fact is that every one of these technologies must keep track of dates in order to operate," said Rep. Stephen Horn (R.-Calif.), chairman of the congressional subcommittee on government management, information and technology, at a March hearing on the issue.

When such devices encounter the date change, some—but not all—will malfunction or shut down. The trick is identifying which will experience a problem; that's difficult both to predict and test. In all, between 2 percent and 4 percent of all microchips will be affected, according to an aide to the subcommittee. Considering that there are billions of microchips in existence, that's no small number.

Based on expert testimony at the hearing, Horn and Reps. Constance Morella (R.-Md.) and Carolyn Maloney (D.-N.Y.) sent a letter to 30 federal regulatory agencies asking them to detail their plans for assessing the vulnerability of microchips in devices subject to their regulation. Among the agencies were the Department of Defense, the Commodities Futures Trading Commission and the Federal Communications Commission. If the letter does not generate enough action, Congress will consider legislation, according to Horn.

"The economic and legal consequences could be substantial," said Horn. "We are concerned that technological failure may also present health and safety problems."

Credit cards could also be vulnerable to the year 2000 problem. In some cases, cards with expiration dates of 2000 or later have been rejected by point-of-sale terminals because the software that processes the transactions did not recognize the two-digit date properly.

The problem is not widespread, according to Greg Jones, manager of corporate relations for Visa USA in San Francisco. In fact, he says, "terminals representing an estimated 99 percent of all transactions are year 2000-compliant." Nevertheless, it is conceivable that entire small communities may not have addressed the issue, he explains.

Nearly all terminals experiencing the problem can be upgraded with new software that can handle the dates, Jones says. Accordingly, Visa has been working with banks and merchants to ensure that they up-

The Home Truth

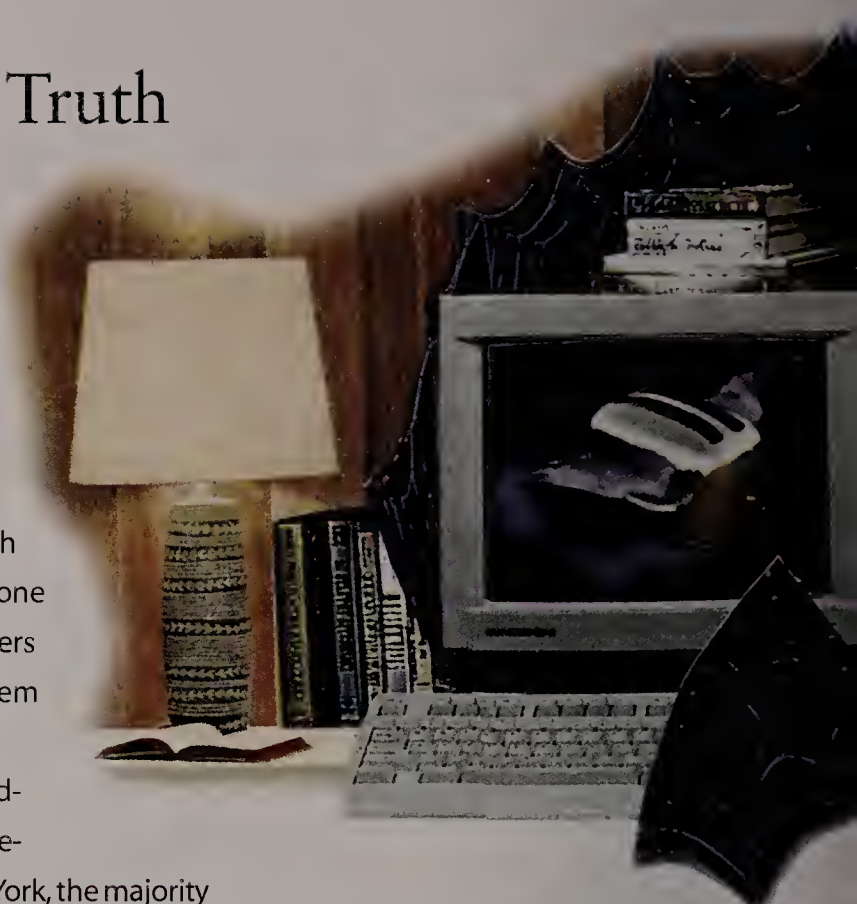
HOME PCs One might think that homes with PCs would be models of productivity, using their machines for tasks as diverse as writing letters and household bookkeeping. Indeed, with so many ways to use PCs, one might think that home users would surely be using them all the time.

Well, think again. According to PC Meter, a market research firm based in New York, the majority of the time home PCs are on, they are not even being used. The company monitors computer usage in about 10,000 computer-owning households to determine when PCs are on and what proportion of that time they are actually being used. According to Douglas McFarland, senior vice president and general manager for the firm, a March analysis indicated that, on days when the PCs are turned on, they are running for 6.6 hours on average. The shocker, though, is that of those 6.6 hours, the machines are being actively used for an average of only 2.8. What that means is that home PCs are idle for roughly 58 percent of the time they are on.

At least they make good paperweights, too. ■

grade. Visa has also been meeting with its competitors to address the problem industrywide. Makers of the terminals, including Hypercom and VeriFone, have also launched upgrade programs. In addition, Jones says, Visa is using test cards and monitoring systems to identify problematic locations.

Finally, Jones notes that there are not many cards with the troublesome expiration dates in use today. Visa issuers, for example, do not use dates later than 1999, except for testing purposes. —Katherine Auer



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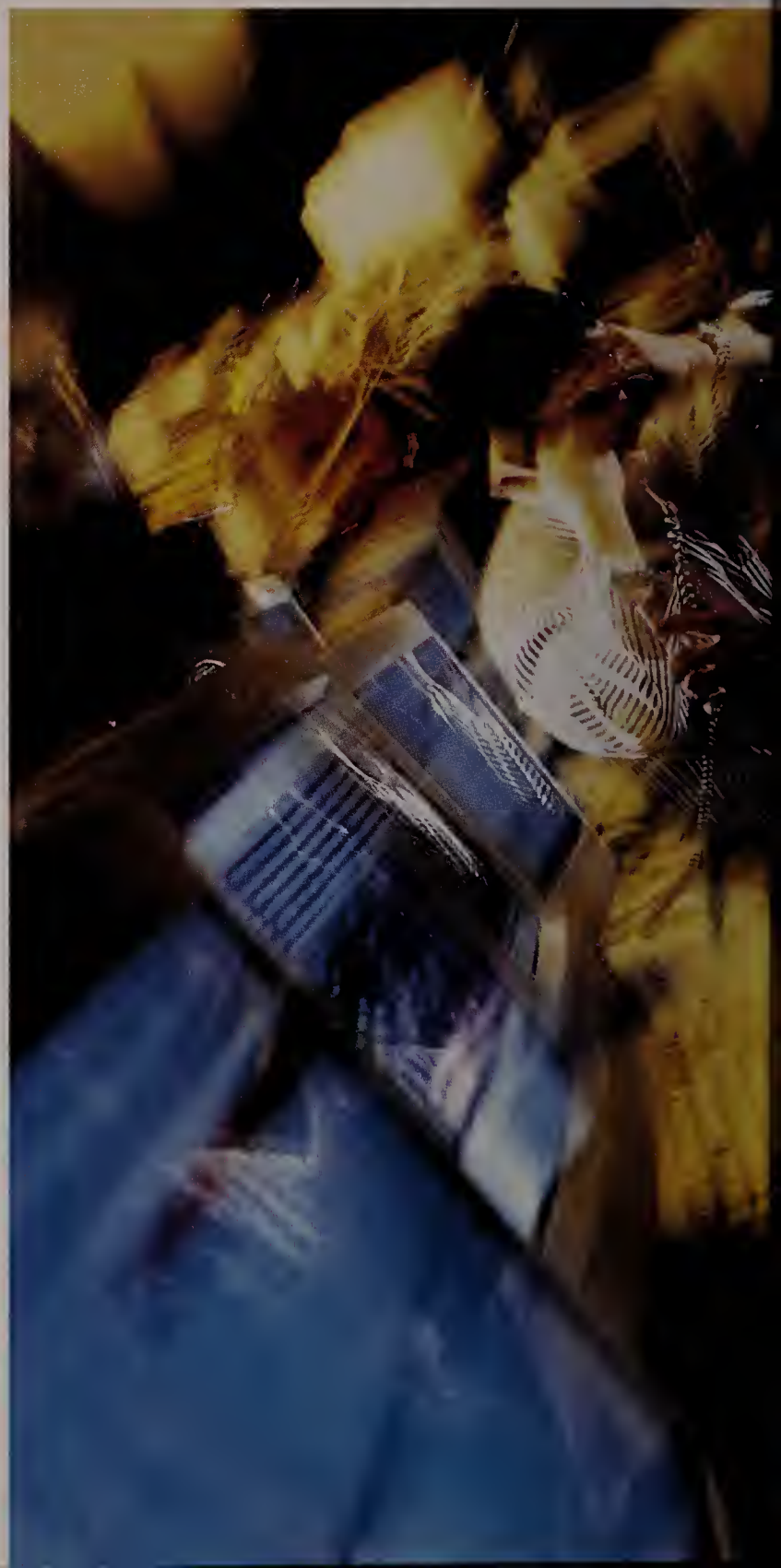
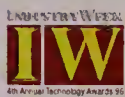
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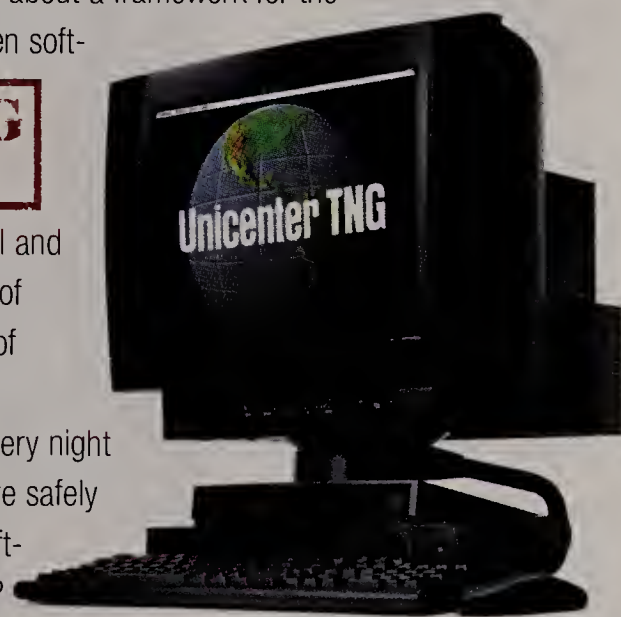
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The Price Is Right

FREE SOFTWARE Next time you're surfing the Web, pay a visit to the Department of Defense's College of Electronic Knowledge (www.dtic.mil/c3i/bprcd/3007.htm). There are lots of free goodies there, including a 6MB business-process reengineering program. Called Turbo BPR, the software can help your BPR effort in the following ways:

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THE CIO DECADE READER SNAPSHOT

Michael Tasooji

Vice president, information services, Disneyland Resort, Anaheim, Calif.

Career Moves, 1987-97:

Two companies, five positions

Years Reading CIO: Four to five

10 Years Ago: Manager of corporatewide financial systems for The Walt Disney Co.; responsible for implementing vendor application systems on an IBM mainframe platform

Constants:

"Ingredients for successful systems implementations have not changed much in the last 10 years. There's no substitute for the fundamentals—establishing appropriate project ownership, rigorous and disciplined project management, scope control, issues resolution and change management. Techniques I used 10 years ago for implementing a mainframe accounts payable system I'm still using for things like intranet or Internet applications."

Greatest Professional Moment: "I had been in my current position only seven months when I had to present our strategic systems plan to the executive team in an all-day meeting. When I finished, there was a standing ovation, and I felt like I had hit a home run. Ten years ago, for the most part, the only time our executives got involved in systems was when we had to go to them for funding. Today the entire executive team in our resort drives systems initiatives."

Best Office Mementos: An acrylic-encased circuit board from an obsolete mainframe Tasooji helped retire and a talking Buzz Lightyear doll that greets visitors with, "To infinity and beyond!"

—Richard Pastore

IN THE NEXT ISSUE, *we'll celebrate the 10th anniversary of CIO. To prepare for our 10th Anniversary issue, we've been asking readers to look back and tell us where they were in 1987 and how they ended up where they are today. We invite you to tell us your story when you visit our Web site at www.cio.com/snapshots.*



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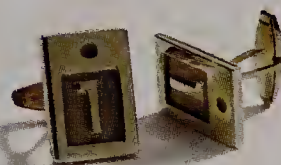
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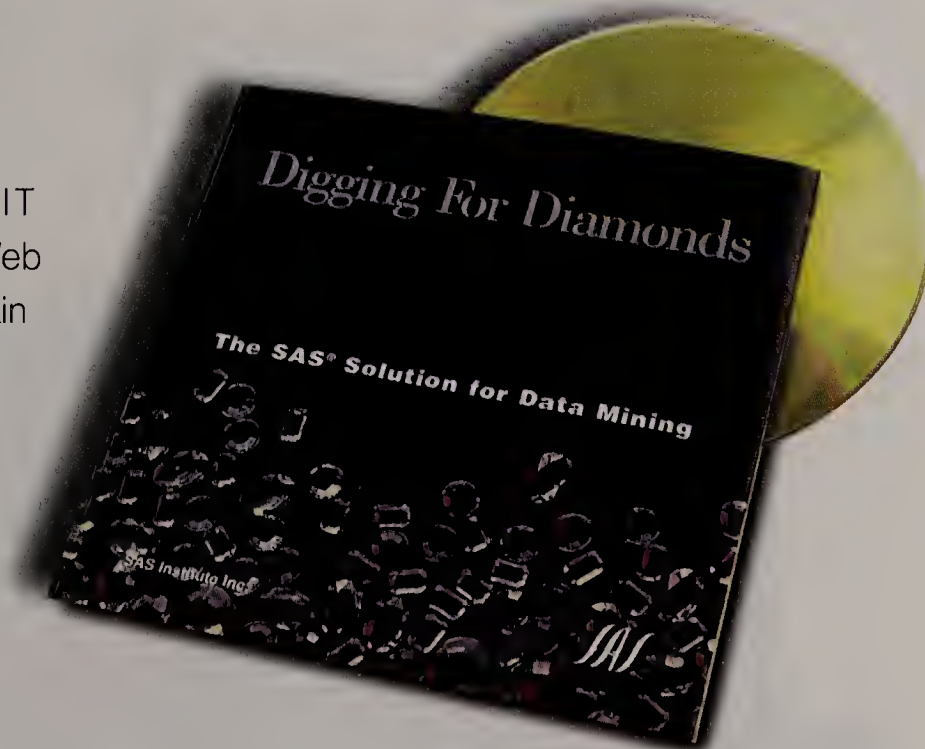
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Change Agent *Edited by Carol Hildebrand*

TRANSFORMING PEOPLE, PROCESSES AND ATTITUDES

Change Channelers

Veterans who've managed IS change successfully offer CIOs tips to transform their IS organizations as well as their management styles

BY SHEILA SMITH AND MARY SILVA DOCTOR

FIRST WE HAD REENGINEERING and outsourcing; these days, it's the Internet and knowledge management. Who knows what will be hot next year? If you ever wanted to crawl into bed and pull the covers over your head until it all goes away, you're not alone. Change can be daunting, but it's inescapable. Navigating change tests the mettle of virtually every CIO because change leadership is fundamentally different from the command-and-control delegation management that succeeded in the past.

Although the CIO's leadership and team-building skills can make or break IT change, few CIOs talk openly about the challenges of leading change. What

specific traits does it take to lead IT change? In our work with Fortune 1000 companies, we've captured the change wisdom of IS executives who are experienced in leading corporate change. Here are five fundamentals of change leadership.

1. "If I'm comfortable, I know something is wrong."

Change naturally involves a certain degree of discomfort. Veteran IT change leaders get comfortable with being uncomfortable all the time. In fact, those most effective at changing IT performance recognize that there's a problem when the journey feels too smooth. As an IS transition leader at a major regional bank coached her

colleagues, "If we don't feel anything, we're not doing anything."

Another IS leader in a financial services company believes that the more uncomfortable a change work session, the more reason to celebrate. How do you distinguish between a run-of-the-mill unproductive session and the kind of discomfort that moves you toward change? If the session raises important albeit uncomfortable issues related to the change, persuades sponsors to fulfill their roles and allows for the emotional cycle of change—from uninformed pessimism to informed optimism—to play out, it's a positive step forward.

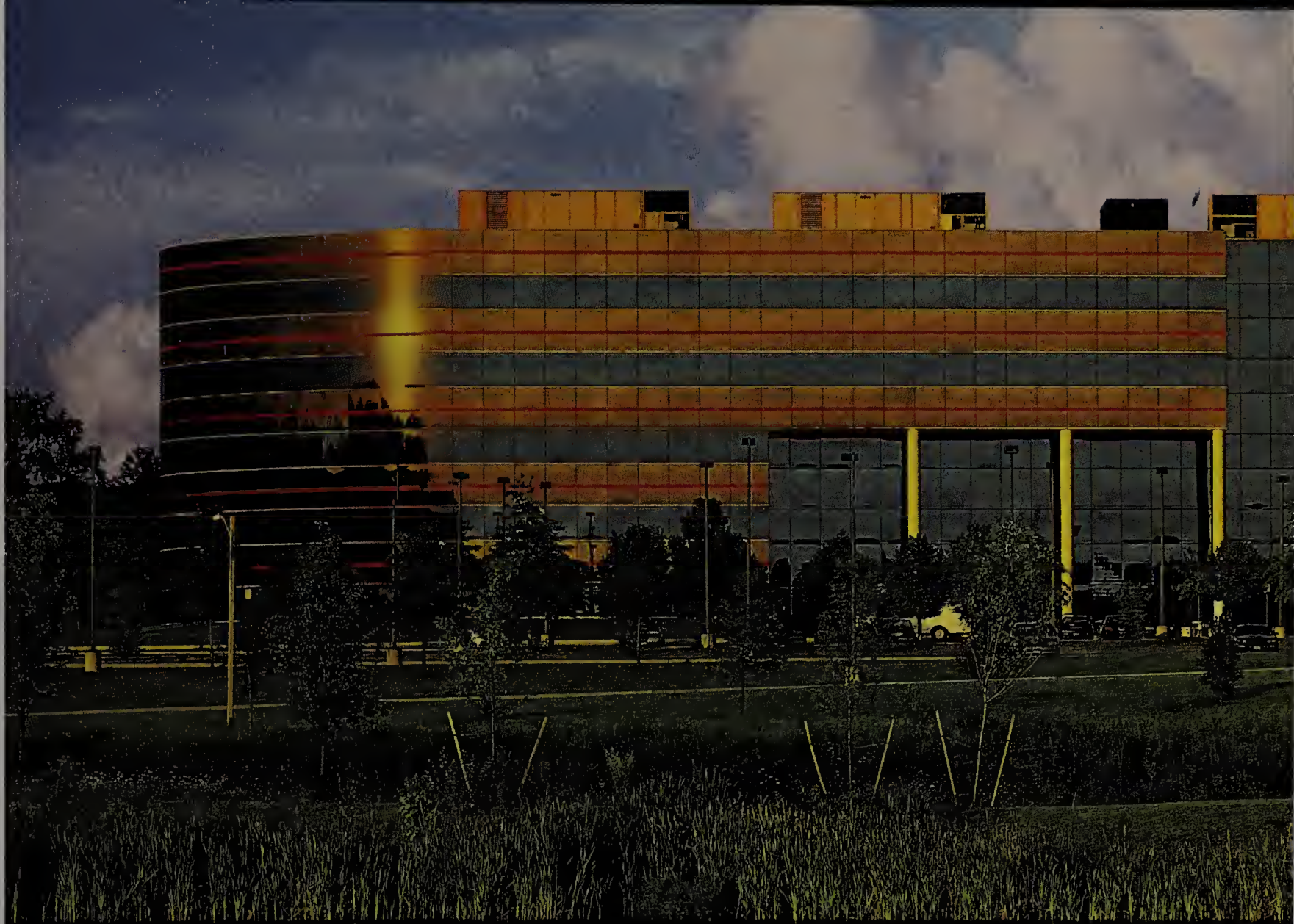
2. "Create visible evidence of the change in the workplace."

Change leaders communicate change in tangible ways, ensuring that people see what's different. And they use a wide variety of methods to reach people who absorb and process information differently. Change leaders know it takes more than a few memos or meetings to engage people in the change.

Spencer McIlmurray, vice president of IT services at Avon Products Inc., has led an IS turnaround over the past three years, moving the group from constantly catching up with business demands to creating business/IT application and infrastructure alignment. One small but significant element of his comprehensive approach was to create visible evidence of transformation by changing the IS work environment. McIlmurray introduced brighter decor throughout the department. He framed the group's vision statement and core values, displayed them in the new learning center and added spotlights to highlight a display of charts tracking progress against key performance measures. These outward changes remind Avon's IS professionals of the more intangible aspects of the change program, such as new methods and skills expectations. These visible



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signs are coupled with mechanisms for helping employees internalize change, such as the framework of cascading priorities that Avon uses. IS professionals identify three top priorities, which are linked to the company's strategic business goals. If those goals change, so do the priorities. That way, employees feel as if they're directly involved in the change as they contribute visibly to the organization's mission.

3. "Repetition never spoils the prayer."

It is nearly impossible for change leaders to overcommunicate. As one CIO told us when reflecting on what he would have done differently in leading a transformation in his organization, "I would have paid more attention to communicating what we were trying to do. The advice I'd like to offer others is communicate, communicate, communicate and, when you think you're finished, communicate some more."

Repeated communication is particularly important because change occurs in waves. Just as there is an adoption cycle for new technologies, the introduction of change follows a similar path. Early change adopters quickly accept the new way of doing business, while the majority lag behind. IT change leaders need to reach everyone in the adoption life cycle no matter how long it takes. JoAnn Ashman, CIO of Amdahl Corp.'s Enterprise Solutions Group, uses the Muslim saying "Repetition never spoils the prayer" to remind her change leaders of the power and value of sustained communications and the need to persist through the full adoption cycle.

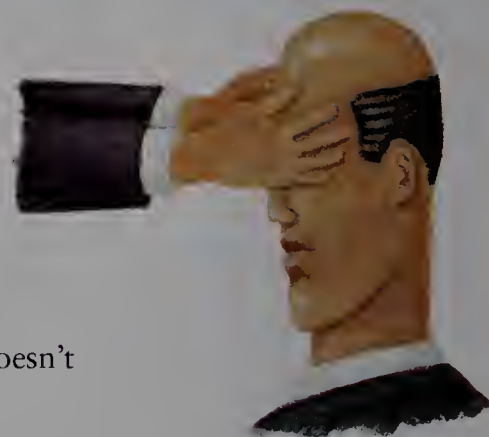
4. "I can't force people to change, but I can give them choices."

Conventional change management wisdom emphasizes encountering and managing resistance. Yet resistance comes from workers' natural inclinations to want to know what's going on, to make decisions about whether or not to participate and to feel themselves competent and successful. "Managing" resistance ought to mean encouraging mature people to make informed choices and move with the change rather than trying to sell people on why something is good for them.

Sure-fire Ways to Derail Change Efforts

1. Communication by Vulcan Mind Meld

Many IS leaders seem to believe that as soon as they think of something, everyone in the organization automatically knows it, too. While this would be a huge productivity booster, unfortunately communication just doesn't work that way.



2. The Rational Person View of Change

"If it makes sense, people will do it" is a variation on "If we build it, they will come." Change is unsettling at best and downright frightening at worst. The emotions that accompany change can stymie rational analysis.



3. Cuckoo Clock Leadership

Effective change leaders create a very personal presence even in very large organizations. Those who are less successful tend to isolate themselves in their executive office and communicate primarily through their staff. One company refers to these change sponsors—who pop out on occasion to champion the cause but otherwise remain hidden—as cuckoo clock sponsors.

4. Sponsoring the Concept, Not the Implementation

Sponsoring the recommended solution from any change program is necessary but far from sufficient. A CIO leading major change must also sponsor the implementation journey. Championing the concept is the easy part; the actual implementation tests even the strongest of change leaders.

5. The Best-Laid Plans

Yes, a transition plan is important. But the plan is not the be-all and end-all of making change happen. The most beautifully constructed, thorough plan isn't worth much if you don't recognize that much of the real change is opportunity-driven, and the opportunities present themselves in day-to-day conversations, hallway gatherings and meetings.

—M. Silva Doctor



When introducing a change program designed to upgrade IT skills, the CIO at an insurance company division presented a broad curriculum to the group rather than forcing people through a training regimen on new tools and techniques. Individuals could then develop their own course of study. At the same time, the skills requirements for new projects were published so the IS professionals knew which skills they would need in order to

get the assignments they wanted. It was up to individuals to acquire the skills that would win them places on the most interesting new development projects.

Effective change leaders respect people as competent professionals. They recognize that sometimes resistance is the only way employees who feel powerless can participate in a change. And they recognize that leading change isn't about forcing people to change. Rather, they



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The Emotional Cycles of Change

For or against change, workers move through predictable responses to acceptance or espousal

WHEN PEOPLE ARE ASKED to change their skills, behaviors or attitudes, they will naturally respond at a deeply emotional level. These reactions vary based on whether a person views the change as welcome or unwelcome. In either case, as the change unfolds, people begin to see ramifications they had not anticipated, and they will move through a cycle of emotional responses. For example, when a change is viewed positively, the cycle of responses includes the following:

Uninformed Optimism: People exhibit initial enthusiasm, high expectations and confidence in the ability to deal with the change. However, their lack of information gives them a false perception of what the change actually entails.

Informed Pessimism: As employees learn more about the change, reality sets in, as well as grave doubts about whether the change can be accomplished; people often check out of the change (either publicly or privately) at this point.

Hopeful Realism: As the changes begin to take hold, workers gain a more balanced perspective. People understand the challenges involved in the change and have realistic hope that those challenges can be met.

Informed Optimism: As the change momentum builds, the light at the end of the tunnel becomes visible; people reach a higher level of optimism and self-confidence about the change based upon actual experience with it.

Completion: People have achieved their goals for the change, are strong supporters of the change and are willing to help others through it.

When a change is unwelcome, a different emotional cycle kicks in. Based on the emotional reactions observed by Elisabeth Kubler-Ross in work with terminally ill patients, this cycle also reflects the emotional cycle of workers who must assimilate unwelcomed change.

Immobilization: From initial emotional stability, people become emotionally paralyzed by the shock of the impending change.

Denial: Workers then move into denial, and they try to convince themselves that the change will not happen.

Anger: Next comes anger, where individuals begin to accept the impending change but are angered by it.

Bargaining: Employees then begin to bargain about the conditions of the change as they try to figure out how much they must really change to get by.

Depression: As change kicks in and workers start to give up old ways, they shift from bargaining to depression. Here, they begin to accept reality and mourn the loss of the old ways.

Testing: As they start working in new ways, people start to test the change. Individuals typically experiment with new methods or explore the scope of the change.

Acceptance: Finally, people accept the change as the new status quo and reach emotional stability.

Although the emotional response cycles are defined here as separate elements, people often shift between cycles several times during a change. When people understand these emotional responses, they are better equipped to deal with them and to move quickly through the transition. These models can provide IS leaders with the knowledge to help their people cope with new ways of doing business.

—Sheila Smith

make it desirable for people to choose to support change. As Avon's McIlmurray says, "My job is to create an environment where people can contribute in a way that enables the organization to meet or exceed its objectives."

5. "I must be an outwardly steady force amid the turbulence."

When the world seems topsy-turvy, change leaders help people see how the new environment fits together by serving as integrators and translators. As one IT executive put it: "When Joe is panicked, his staff gets panicked. He must be the steady force during these changes."

Stellar IT change leaders, such as Tom Perrine, executive vice president at Key Services Corp., create images—both graphically and in conversation—

that help people connect changes with their day-to-day work. Images provide people with anchors, answering the question, "How does this fit with my role?" They talk about the changes in concrete terms that make sense to the person with whom they are conversing. Effective change leaders might position a proposed client/server migration in terms of its technical benefits to a programmer and emphasize its business benefits when talking to an IS customer.

Change leaders also watch for contradictions in their environment that cause people to panic and help people either resolve or learn to accept those contradictions. For example, Perrine notes, one of his managers helped his group see IT architecture as an en-

abling, as opposed to controlling, force for projects.

Being an effective IT change leader requires the courage to change personally, the ability to make tough choices and the creativity to overcome hurdles. It also demands discipline, patience and recognition that change happens one person at a time. Change leaders must be reflective and honest about their leadership capabilities in order to adapt as needed to the shifting demands of constant change. **CIO**

Sheila Smith and Mary Silva Doctor are managing partners of Omega Point Consulting, an IT management consulting firm based in Winchester, Mass. They can be reached via e-mail at sjsmith@omegapt.com and msdoctor@omegapt.com.



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Get Real on Cost of Ownership

Capital and operational costs are easy to calculate, but how do you measure hard and soft benefits?

BY DAVID CEARLEY

IS DEPARTMENTS ARE INCREASINGLY organized as internal businesses that provide products and services to internal customers. But realistic executive customers can be a hard sell. They listen, they think and, like the educated consumers they are, they inevitably ask, "What does it all cost?"

There are no easy answers.

Internal customers won't easily buy into esoteric or theoretical advantages of a technology but insist on knowing what benefits they will directly or indirectly reap from a particular technological change. Whether a technology change is proposed by the executive director of a line of business who vaguely understands the complexity of a request or by the director of an IS department, IS executives are expected to deliver a holistic real cost of ownership (RCO) model that uses business-based metrics to evaluate and communicate a technology's effect on the enterprise's bottom line.

Two kinds of costs and benefits must be evaluated in all cost of ownership models. "Steady state" costs and benefits are ongoing. While it is possible to quantify steady state IS costs, often it is difficult to quantify the steady state benefits that IS produces. Instead, IS departments should

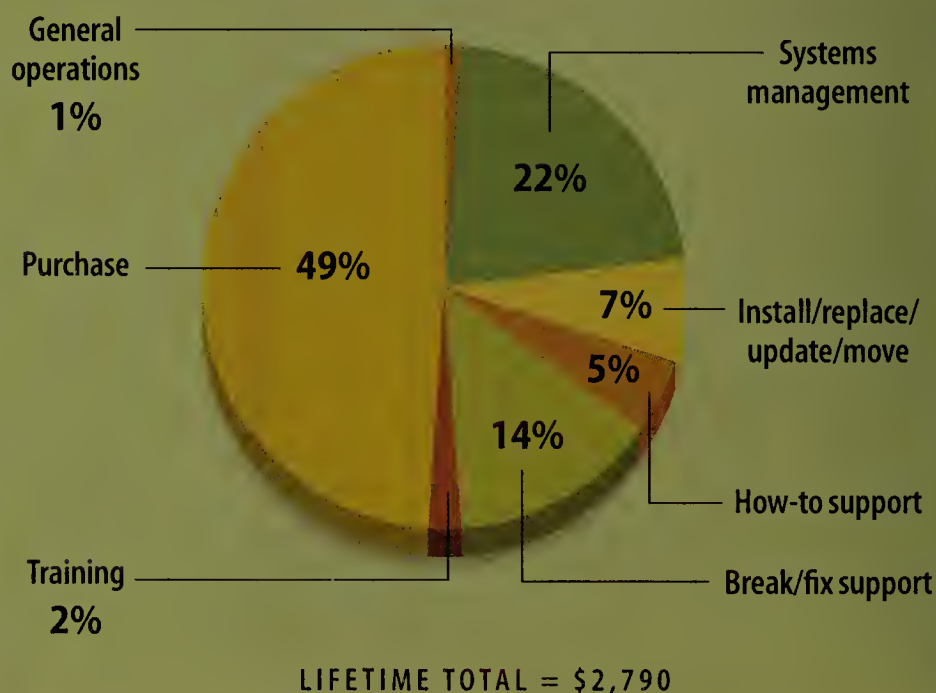
attempt to quantify only the second type of costs and benefits, those that are incremental or brought about by

ease of use, faster response times and wider data access and transform them into quantifiable benefits such as head count reduction, increased productivity or a decrease in cost of goods sold. But, like it or not, IS managers must frequently make a subjective "gut feel guess" of what a project is worth by comparing qualitative benefits with quantitative projected costs.

Cost of ownership models often inappropriately mix hard and soft costs, use incompatible assumptions to compare alternative architectures and ignore the benefits that accrue with ownership. A complete value analysis supplies an IS manager with the tools to determine internal pricing for services, improve efficiencies, benchmark

PC/LAN Costs

The initial purchase amounts to less than half the total cost of ownership of a PC/LAN environment



SOURCE: META GROUP INC.

a particular migration or change (for example to 32-bit Windows or fast Ethernet). In many cases, it is possible to take intangible benefits such as

operations, evaluate outsourcing options and justify capital investment in both infrastructure and applications. To determine RCO, IS managers must



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separate those items that can be quantified easily from less tangible factors and consider them in separate models.

Quantifying the Costs

Capital and operational costs are the major expenditures for which IS is most directly responsible and on which IS managers can have the most effect. In contrast, end-user costs do not appear on IS budgets and are the most difficult to measure and change. A popular practice lumps together both cost categories to identify total cost of ownership; however, this approach, which combines fundamentally different categories into a single model, is ill-advised for three reasons. First, so-

actually reduced under any managerial scenario. The amount of time users spend initializing, maintaining and operating their systems remains relatively constant; the actual financial variable is the return or benefit derived by a constant investment of user time. Therefore, since user time with most systems remains invariable, those associated time costs are better calculated as part of productivity rather than as a technology cost issue. Third, we have found a gap between what IS managers say and what executive customers hear. An IS manager who is selling a system improvement argues that implementation of a particular technology will reduce overall costs by reducing hid-

■ **Standards.** Multiple platforms are difficult to manage and can double operational costs while reducing user productivity because of the complexity of testing and integrating systems.

Successful IS organizations must develop a systematic methodology to measure the real costs and benefits of technology.

■ **Application portfolio.** Application mix includes the type, number and availability requirements of the application portfolio. Certain applications, such as airline reservation systems, have a much higher priority within the business and, because they are more critical, require a higher level of support.

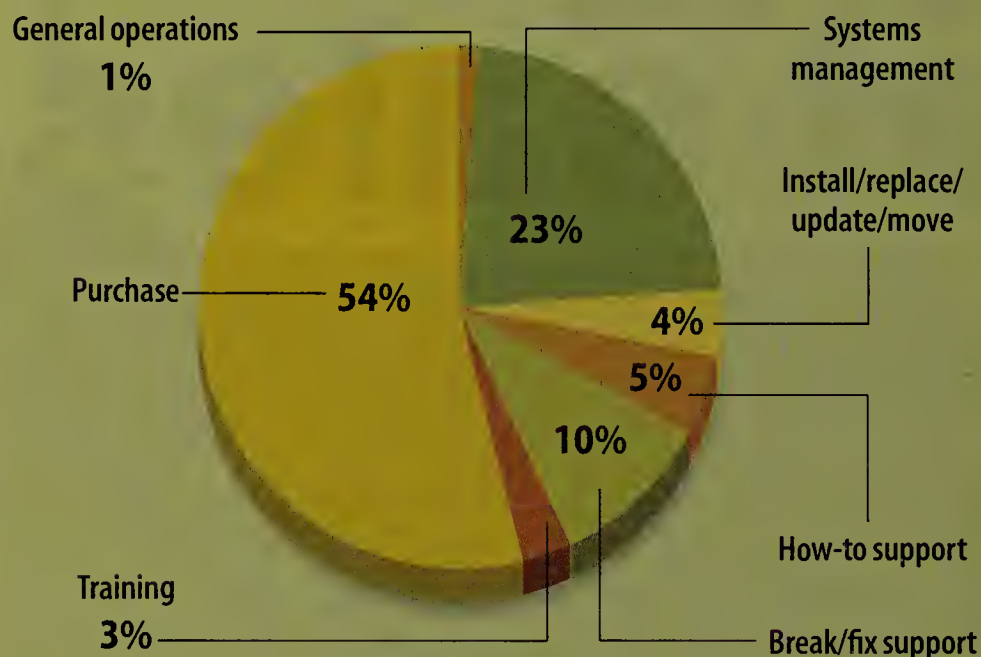
■ **User population profile.** Because the economies of scale have an enormous impact for many operational costs, any RCO model must account for the number of supported users and their geographic dispersion. For geographically dispersed organizations, if no IT staff is present, operational tasks must be outsourced at premium rates. Organizations should negotiate warranty agreements to include on-site service for all locations.

■ **Service-level requirements.** Guaranteed response and resolution rates for help desk calls have to be included in calculating the RCO, but the cost of delivering actual systems must be included as well. Some lines of business will inevitably request more frequent application or system updates than other lines of business. Fortunately, this factor is the most negotiable with the internal IS customer base.

■ **IS management infrastructure.** Automated management tools, such as electronic software distribution, hardware and software inventory tools, remote control/diagnostics and help desk trouble ticketing, and knowledge-based tools are the most effective ways to reduce IS costs without eliminating the perceived value IS provides to business units. Organizations should look to-

Managed PC Costs

A more expensive initial investment in a desktop can lead to reduced costs down the road



LIFETIME TOTAL = \$2,464

SOURCE: META GROUP INC.

called hidden user costs, such as shadow support—the loss of productivity when one employee trains another—are often deemed equal to “hard” costs, inflating the cost of technology in the minds of users. That inflation is unacceptable in an enterprise that makes the IS department the seller and the user the buyer. Second, our analysis shows that many of these hidden costs are not

den costs. Executive customers often hear only *cost savings* and expect a reduction in IS budgets. Never, heaven forbid, their own. (See “Using RCO,” Page 42.)

Gauging RCO

To establish a baseline to measure costs, RCO analysis must consider the following:

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Using RCO

Compare the cost of NCs with that of standard desktops

REAL COST OF OWNERSHIP (RCO) analysis should be used to compare architectural alternatives at the client, server and network levels. For example, this approach to cost model strategy is important when evaluating the potential impact of network computers (NCs) as a way to reduce overall cost of ownership.

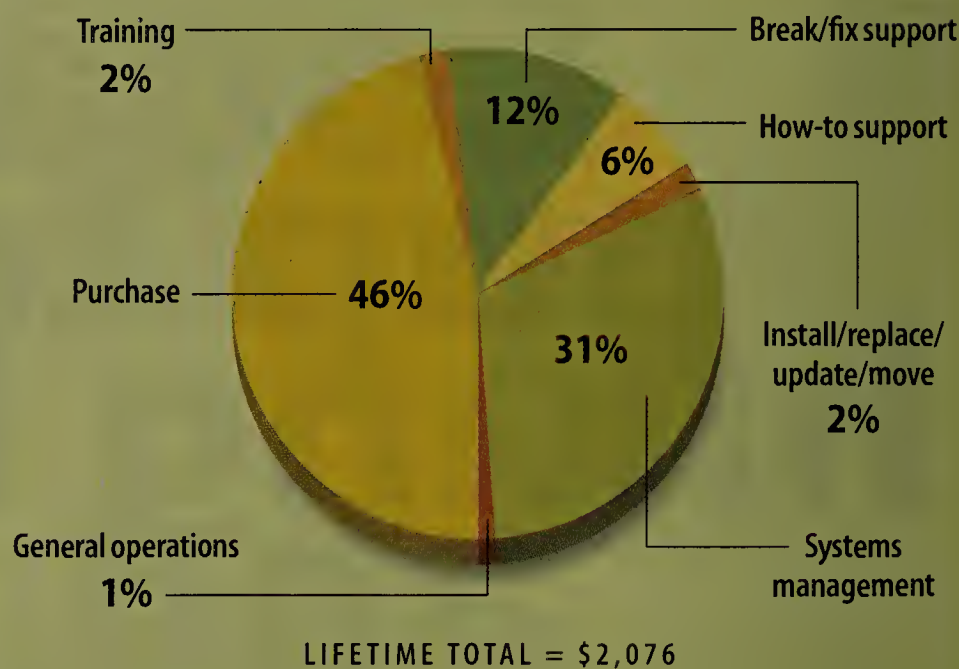
Meta Group Inc. has researched global companies that have a 10,000-user organization distributed across multiple international locations with minimal standardization and systems management infrastructure. Their expenditures on equipment (capital costs) and human resources (operational costs) make the cost of a typical distributed LAN environment nearly \$2,800 per year per desktop. Traditionally, capital costs seemed insignificant when compared with operational costs. However, our research shows that when the costs of clients, servers, networks and applications are considered, capital costs virtually equal operational costs for the life of the system. Therefore, asset management strategies that minimize direct costs and seek to extend technology life cycles will have a significant impact on overall IS costs.

An optimal strategy must find the balance between paying for the latest and greatest and maintaining and caring for dinosaurs. The operational costs (approximately \$1,400 per PC per year for a typical PC/LAN environment) are measured on the full-time equivalent personnel needed to provide a given level of service. This RCO model shows these operational costs can be more than half of total costs (see "PC/LAN Costs," Page 38).

It is no wonder that the promise of the "zero maintenance" NC has sparked IS interest. In fact, a pure NC model with thin terminal-like clients and heavily managed or controlled environments will save 30 percent in overall capital costs and 26 percent in total costs over a typical

NC System Costs

Nearly one-third of the real cost of owning a network computing system is absorbed by management tasks



SOURCE: META GROUP INC.

unmanaged PC environment, according to our research. At first glance, the NC would seem to be an obvious choice for those organizations wishing to reduce costs (see "NC System Costs," above). However, using the principles of RCO, further analysis shows that some costs will increase in an NC environment. With greater demand placed on server and network resources, these costs will offset key parts of the NC savings. In addition, the NC model assumes that IS totally redesigns all its applications, a process that will likely prove costly and painful. Finally, the NC model assumes IS can tightly manage the user environment, including the "lock-down" of all client devices, disallowing any user installation of hardware and software.

Given the tantalizing potential of the NC and the significant risk and additional cost factors, IS organizations are more often looking at a middle ground. Using the RCO models and an existing LAN environment, IS can approach NC-like savings by moving toward a managed PC environment (see "Managed PC Costs," Page 40). User surveys show that this middle ground increases standardization while limiting user installation options and can reduce overall costs by 12 percent—approximately one-half of the target NC savings. —D. Cearley

ward automated management processes that will provide a significant amount of centralized control yet offer enough user flexibility.

Successful IS organizations must move beyond the generic vendor-hyped cost of ownership models to develop a systematic methodology to measure the

real costs and benefits of technology. In determining RCO, IS executives must focus on measurable costs that they can directly control, factor in the actual application requirements for the target organization, compare various architectures with an eye toward the cost of migration and, finally, emphasize the less

tangible benefits of the change. **CIO**

David Cearley, senior vice president and service director of Stamford, Conn.-based Meta Group Inc.'s workgroup computing strategy service, can be reached at 203 973-6700 or david.cearley@metagroup.com.



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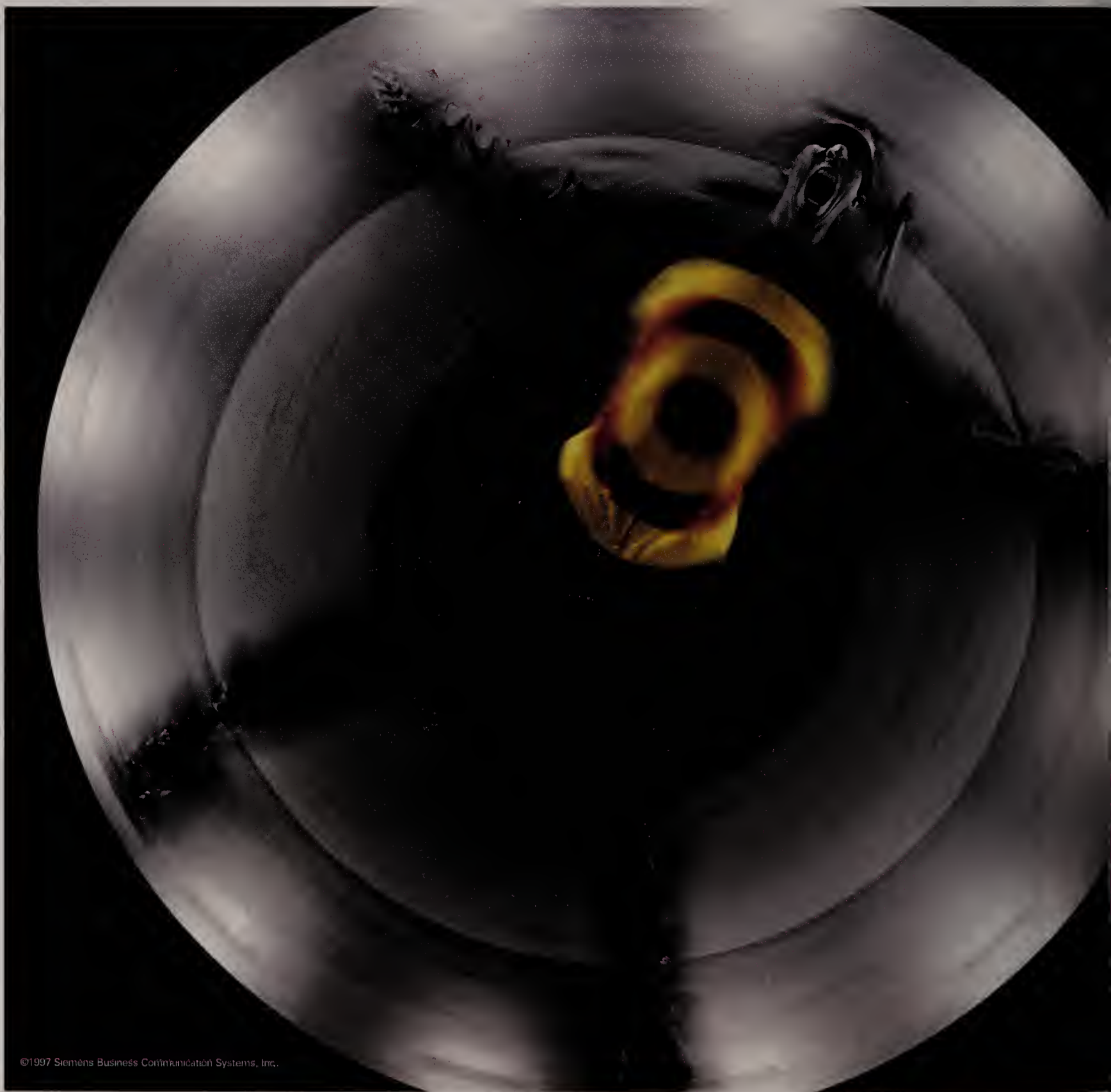
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UNEASY MONEY

BY MALCOLM WHEATLEY

HARD AT WORK GETTING READY FOR JAN. 1, 2000? Spare a kind thought for Europe's beleaguered CIOs, who have a more pressing deadline: the European Monetary Union (EMU), slated to start replacing Europe's existing currencies as of Jan. 1, 1999. But unlike getting ready for the millennium, one of the trickiest aspects of preparing for EMU is to find out exactly what

it is that a CIO is preparing for. "It's a shambles," charges Dennis Keeling, director of Europe's Business and Accounting Software Developers' Association (BASDA). Keeling, as well as others readying for the euro, waits for further clarification of such practicalities as the details surrounding post-EMU accounting standards to emerge from a June meeting of European Union (EU) government heads in Amsterdam. Until then, there was "very little legislation to fall back on, and most countries are leaving it to commercial organizations to determine how they should meet the requirements for EMU—if and when it arrives," he notes.

Reader ROI

THE CONSEQUENCES CREATED BY the European Monetary Union's coming universal currency remains unclear. In this article, you'll learn

- ▶ How European enterprises are preparing their IT infrastructures for the currency change
- ▶ The effects of the euro on non-European countries
- ▶ Handling culture clashes and undesirables
- ▶ How early adopters are preparing to take advantage of the movement to a single European currency

Editor's Note: Currency conversion rates are accurate as of Aug. 1, 1997.

Ambiguities bedevil the CIO preparing for the single currency. "Part of the problem is the extent of the uncertainty surrounding EMU," says Simon Orebi Gann, managing director of information technology at the London International Financial Futures and Options Exchange (LIFFE), one of London's main financial markets and the world's second-largest derivatives exchange after the Chicago Board of Options Exchange. "The date isn't clear, the political context isn't clear and the requirements aren't clear," he says. Nevertheless, he insists, the LIFFE will be ready.

The London exchange is fortunate because it is comparatively young, he says. Founded in 1982, it has modern systems and is used to dealing on a multicurrency basis. Most significantly, the nature of LIFFE's trading helps: Many people and institutions are buying and selling in multiple currencies—and they need to do that in a single currency. EMU "would be much more difficult if we had to deal with the euro in parallel," Orebi Gann says.

"It isn't a simple foreign exchange conversion," stresses Jonathan Charley, head of financial services consulting at the Farnborough, Hampshire, England, headquarters of Computer Sciences Corp.'s (CSC) consulting arm. "Businesses literally will be working in two currencies at once." In the run-up to the euro, he adds, "a large part of the challenge for businesses lies in guessing what the shape of EMU is

going to be." Weighing the costs of guessing wrongly against the likely competitive advantage from a slick and timely conversion is the dilemma, he points out.

Money to Be Made

Despite the risks, some companies have been attracted enough by the possible competitive advantage to have made capitalizing on the euro part of their overall business strategies. Barclays Bank, for one, is excited about the euro—viewing its adoption as a hurdle that a number of its competitors will be unable to leap. "Ultimately, we think there will be no more than 10 big players in the cross-border payments market. We intend to be one of them," says Claude Leguay, London-based director of payments strategy for Barclays Bank.

Accordingly, a project team began looking at converting the bank's systems to euros last September. The intention, he explains, is to be ready Jan. 1, 1999, and then take advantage of the bank's position. "We are determined not to lose a single customer, or a single transaction," Leguay says.

But not every business is as ready—not even at the level of basic compliance, nevermind strategic advantage. Two-thirds of Europe's businesses employing at least 5,000 people and with a European headquarters in one of the EU states have no existing plans for dealing with the euro—and about half of those companies are not developing one, either, according to "Europe's Preparedness for EMU," a research report published in early 1997 by U.K. management consultancy KPMG. German companies are most prepared, with a majority of businesses having formulated a strategy; U.K. companies are least prepared, with only one in five having a plan, according to the report. "Many of those who are aware or concerned about the impact of EMU seem to be firefighting rather than exploiting the opportunities that it will bring," says Malcolm Stirling, KPMG management consulting director responsible for year 2000 and IT aspects of EMU.

Despite this seemingly relaxed state of affairs, an article in the Feb. 5, 1997,



Guy Allen is sure his best bet is to tackle the year 2000 issue and the euro question at the same time.

London Financial Times caused a stir when it claimed that after Jan. 1, 1999, the beginning of a three-year transition period, large companies would be forced to report their accounts in both euros and their domestic currencies, thus requiring general ledger programs capable of handling at least two units of exchange. However, Paul Jarvis, a project manager at the London office of accountancy firm Price Waterhouse, says such speculation is premature. "It's an interpretation—although not entirely an incorrect one," he says. "The intention is that there should be no compulsion to use the euro [from Jan. 1, 1999, to June 1, 2003, the period of parallel currencies], but neither should there be any barrier."

Not a Lot of Choices

Unfortunately for most of Europe's businesses, dealing with the euro in parallel will be compulsory—and not every business will have the luxury of relatively modern systems. If customers insist on price quotes in euros and subsequently paying in euros, sellers will have little option but to somehow alter their systems to cope. On a company-to-



Claude Leguay is determined not to lose a single customer, or a single transaction.

company basis, the costs will vary enormously, depending upon the nature of the business and the age and type of systems the business has.

According to "The Cost and Timescale for the Switchover to the European Single Currency for the International Securities Market," a survey by the European Economics and Financial Center, a research institute in London, adjusting to the euro could cost some companies a few thousand dollars, and others a few million dollars. Retailers, which will have to handle dual currencies in notes and coin form, will be among the hardest-hit sectors. EuroCommerce, a Brussels-based consortium of European industry groups, reported in October 1996 that the cost of the introduction of the euro to Europe's retailers was likely to reach \$35 billion. For example, Marks & Spencer PLC, a U.K.-based retail chain with 651 locations in 32 countries, will be re-equipping

its store tills all across Europe—including those in the United Kingdom, which most observers expect not to be in the first wave of countries adopting the euro. The overall cost to Marks & Spencer, includ-

to assess this any more accurately."

The timing of EMU is critical to the chain's calculation: A delay in the introduction of the euro until the early years of the next century would mean that most of

"Suppliers are working hard to understand the requirements, which are far from being defined."

- MARTIN MACKAY

ing new computers, software, registers, implementation and training, could reach nearly \$6 million, according to company spokeswoman Cheryl Kuczynski, who adds that "until the time scales and legislation details become clearer, it is difficult

the investment already committed to update its cash register technology to be euro-compliant would have been made too soon. Marks & Spencer estimates its minimum specific cost of conversion to be \$16 million, chiefly for software.

Multinational Money

The euro's adoption will have international consequences

Joining the Club

In an attempt to ensure their economies will be as closely aligned as possible, European Union politicians have agreed to a set of so-called Maastricht macroeconomic criteria that countries seeking to join EMU must meet.

- Government deficits should be no more than 3 percent of GDP.
- The level of public sector debt must be no more than 60 percent of GDP.
- Long-term interest rates must be no more than 2 percent higher than those of the three countries with the lowest inflation rates.
- Inflation must be no more than 1.5 percentage points higher than that of the three countries with the lowest levels of inflation.
- A prospective member country's currency must have traded within the "normal" bands of the existing European Exchange Rate Mechanism for two years.

-M. Wheatley

U.S. COMPANIES TRADING WITH Europe will soon notice a new currency creeping into deals that aren't dollar-denominated: the euro, which is scheduled to come into existence Jan. 1, 1999. Although notes and coins won't be issued to the public until three years after that, euro-denominated bank accounts can be opened right away, with transactions in euros being made immediately.

Many companies will want to use the new currency. "As a business that reports in dollars, we obviously participate in some pretty heavy hedging programs. It's obviously a cost to the business," says Mike Newton, Bracknell, Hertfordshire, England-based managing director of Dell Computer Corp. "Dealing with just one currency will be both easier and cheaper." Customers are likely to prefer the euro, too, he adds. Almost three-quarters of Dell's European business is corporate customers—and increasingly it seems, larger customers want to specify a personal computer product once and have it available on a pan-European basis at an agreed price. Currently, the only pan-European pricing available is in dollars, a medium of exchange that generally involves both buyer and seller in currency conversion costs.

While it's not hard to see the benefits of a single currency, there will certainly be some short-term pain. Newton contrasts Dell's multibillion-dollar U.S. business, which transacts business in one currency, with the company's much smaller European operation, which is forced to sell in 15 currencies. Most of the pain will be associated with the three-and-a-half-year period of parallel currencies, before national currencies are withdrawn. During that time, companies will need to decide how to handle and account for payments made to them (and by them) in two currencies.

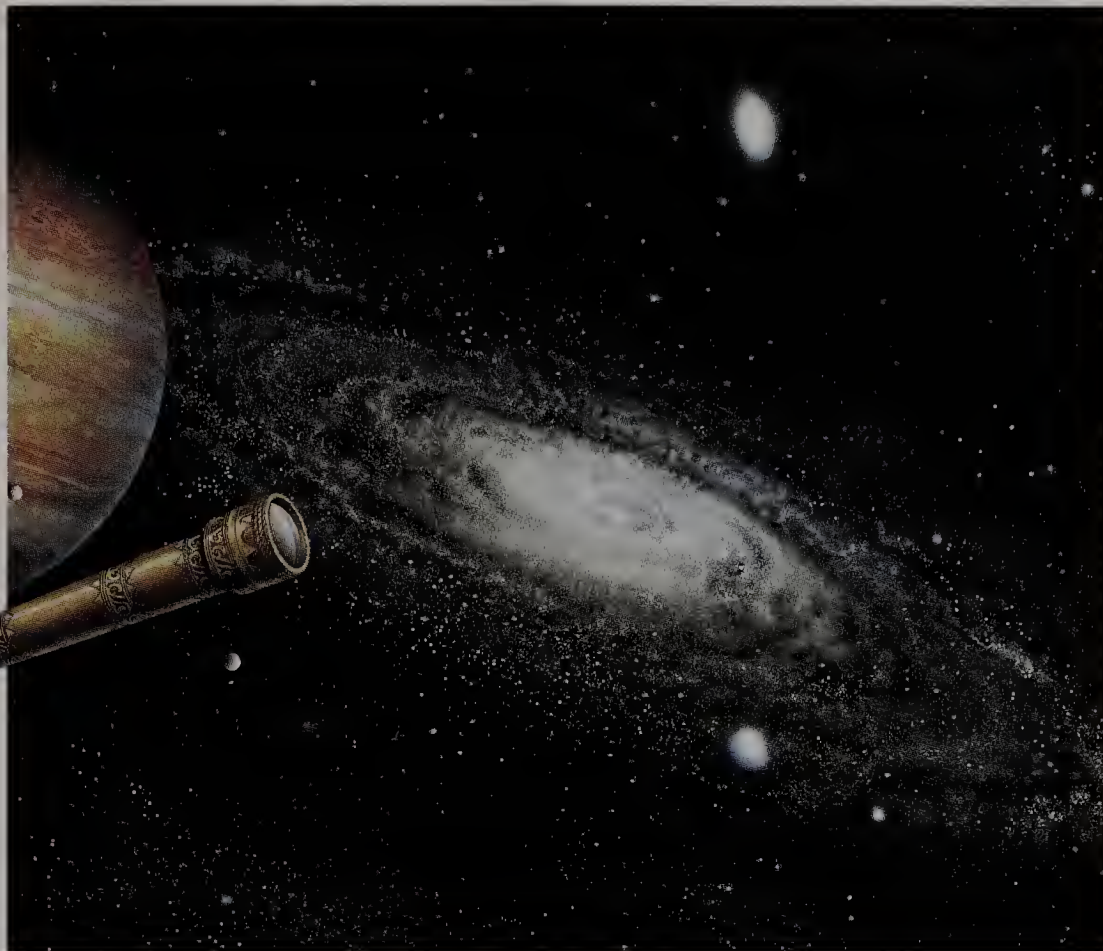
The good news? Major systems vendors claim to be ready to launch euro-compliant releases, so the only necessary adjustment may be an upgrade. The bad news? Despite the proximity of Jan. 1, 1999, an awful lot of details need to be finalized. Europe's politicians and bureaucrats, it seems, prefer the politics of the euro to the practicalities.

-M. Wheatley

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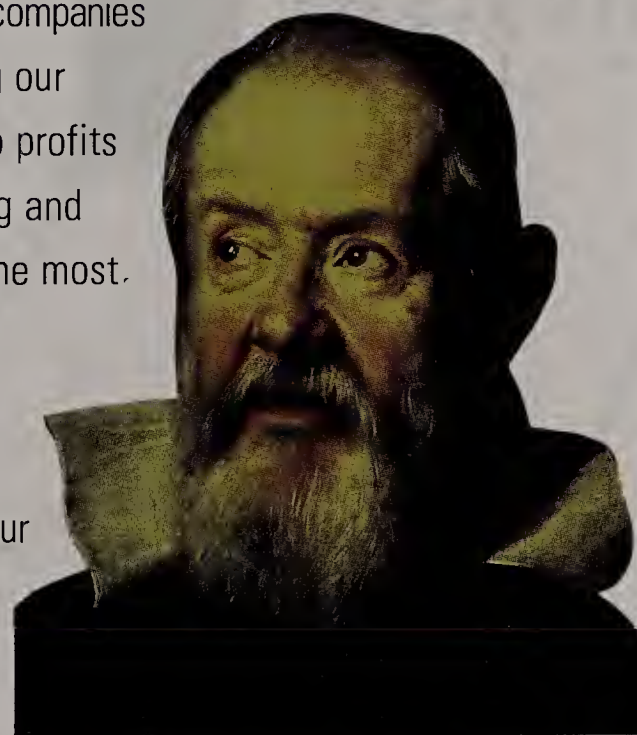
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Although Hewlett-Packard Co.'s plans are less advanced than Marks & Spencer's, which has been praised for the extent of its advanced planning, "we already know that we'll need many man-years of effort in the sales administration area," says Roger Wilson, European director of communications and public affairs at HP's Geneva headquarters. Within the company's European organization—which with 1995 sales of \$13.3 billion contributes roughly 35 percent of HP's worldwide sales—Wilson is responsible for formulating the company's response to European public policy initiatives. He sits on a multifunctional task force set up to work out how to deal with the euro.

With 18 European manufacturing locations and 141 sales and support offices in 27 countries (not all of which, of course, are in the European Union), HP's problem is not simple. The task force, Wilson explains, is getting the people within each business function in the company to throw themselves mentally forward into 1999, assume that the euro has arrived, and ask themselves, "What will I have done to be ready for EMU?"

Roger Wilson
is part of a
Hewlett-
Packard strat-
egy task force
to work out
how to deal
with the euro.



The Change Will Be a Changin'

The timeline for the euro includes the replacement of hard cash

SOMETIME IN 1998—and the betting at the moment is on June, in order to provide weaker economies as much time as possible to meet the economic convergence criteria (see "Joining the Club," Page 48)—Europe's politicians will agree which countries will be participating

in the first wave of the European Monetary Union, scheduled to take place a few months later. Alternatively, they may opt to agree to delay implementation, particularly if the troubled German economy remains fragile.

Jan. 1, 1999 Although no notes and coins will be issued for another three years, the euro becomes a unit of currency. National currencies in participating countries will remain legal tender but at permanently fixed exchange rates. Euro-denominated bank accounts can be set up, prices quoted and payments made.

Businesses in nonparticipating countries must be prepared for trading partners in participating countries to deal in either euros or in the former national currencies such as French francs, German marks or Italian lire.

Jan. 1, 2002 Euro notes and coins will be introduced. National currencies will start to be withdrawn. Stores' registers—and bank ATMs—must be able to handle two currencies. Paychecks, utility bills and many other transactions will start to be processed in euros, even though the previous national currencies will remain legal tender.

June 1, 2002 Latest date for the withdrawal of national currencies. After this, subsequent countries may join—in second, third or even fourth waves. The ultimate intention is for every member of the European Union to join, apart from a handful of countries that may deliberately opt out on grounds of national sovereignty. As the EU expands, so will the number of countries using the euro.

—M. Wheatley

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The Price of Admission

*Weakening economies may mean delays
and exceptions for the European
Monetary Union's first wave*

A YEAR OR SO BACK, THE EMU looked certain to happen and to happen on time. The economies of the most committed countries—France and Germany—appeared in good shape to meet the critical economic convergence criteria laid down in the European Union Treaty of 1992, or the Maastricht Treaty, and Europe's politicians were arguing over how strictly the criteria had to be interpreted to allow the desperate-to-join Mediterranean economies of Italy, Spain and Portugal into EMU's first wave.

Today, the German economy is in poor shape and may need a little lenient interpretation itself—although too much leniency will doom the euro in the eyes of the financial markets. What's more, the euro has become a political hot potato with Europe's voters, who are just now waking up to the extent to which their lengthening unemployment queues, rising taxes and tight government budgets can be blamed on politicians' desperate attempts to bring their national economies in line with performance targets laid down several years before in the Maastricht Treaty. Suddenly, EMU is unpopular—and politicians recognize that last-minute belt tightening is unlikely to find favor.

Publicly, German politicians are still optimistic that EMU will begin Jan. 1, 1999, and that Germany will be in the first wave. Officials at Bundesbank, Germany's central bank, are less sanguine, although few observers expect EMU to take off without German participation. In particular, despite a recent fall in unemployment rates, Bundesbank officials worry that Germany will not be able to bring its public sector deficit down to below 3 percent of GDP in time, a requirement of the Maastricht Treaty.

A meeting of Europe's finance ministers in early April calmed money market analysts' worries about delay, but the mere fact that such doubts are so publicly expressed will worry those committing scarce resources to being euro-compliant on day one. A weekly EMU-watch, based on polled economists' views (including those from Goldman, Sachs & Co., Saloman Brothers Inc. and PaineWebber Inc.) published in a British national newspaper, *The Independent*, persistently has suggested that only around two-thirds of the analysts expect EMU to begin on time. Unless some of Europe's economies—especially Germany's—pick up speed in the months ahead, expect that proportion to increase. —M. Wheatley

While some executives see few problems—the legal people basically are saying that it's business as usual; contracts simply will be in euros—the full impact on processes such as sales, logistics, procurement and payroll won't be known until the task force reports, says Wilson.

Guy Allen also is examining the impact of EMU. The IT director at Dell Computer Corp.'s European headquarters in Bracknell, Hertfordshire, England, says that despite having a potpourri of systems,

Dell's operations are in pretty good shape. Although, like most executives looking at the issue, he accepts that “some requirements haven't yet bubbled up [to the surface].” Allen's strategy is twofold. First, the development team looking at the year 2000 issue also is tackling the euro question. Second, he's keeping close to the various suppliers of the company's IT systems—such as SAP, whose software runs the HR function—to make sure they have plans of their own in place for the euro.

Replace or Modify?

But are suppliers of third-party solutions in any better shape?

“Tacitly, suppliers have a problem,” says Martin Mackay, PeopleSoft's European product strategy manager at the company's Reading, England, office. “We're still working hard to understand the requirements, which are far from being defined.” Europe's politicians “seem to think it's a done deal, but not much has been done to consider the issues affecting the IT industry,” he complains. As far as the requirements are understood, however, PeopleSoft 6, whose base architecture will be able to support the euro in its General Ledger product, plans to be fully compliant with its release of Accounts Payable and Accounts Receivable products by the first quarter of 1998. SAP AG, too, is planning to launch year 2000 conversion tools for its R/2, and no migration or upgrade is required for R/3 customers. Companies with legacy systems looking to comply will have to go through old and possibly poorly documented legacy code twice—for the year 2000 issue and the euro, says Steve Rogers, Oracle Corp.'s London-based head of financial services. “The marketplace is starting to wake up to the fact that it's throwing good money after bad,” he adds. Replacement rather than modification “is being taken very, very seriously.”

But most CIOs will recognize that replacement is hardly a pain-free option. Robin Guenier, chief executive of London-based Taskforce 2000, a U.K. government-sponsored organization that helps companies with year 2000 compliance, notes it is extremely unfortunate that EMU has come along at the same time as the millennium problem. “IT projects often run late, but these two cannot be allowed to,” he says, arguing that although 2000 can't be delayed, EMU ought to be. Forcing businesses to tackle the two changes simultaneously “increases the risk that both changes will be botched,” he notes. Deferral on such pragmatic grounds, however, seems unlikely, given European politicians' overt love affair with the euro. Political disaster though it might be, the best bet for many CIOs may well be to pray for EMU's postponement. **CIO**

Malcolm Wheatley, a British freelance writer from Devon, can be reached at malcolm_wheatley@compuserve.com.

Finding It Online

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A man with grey hair, wearing a light-colored suit and a patterned tie, is sitting on a dark ledge. He is smiling and looking towards the camera. The background is a clear blue sky.

Michael Lezenski:
"We had to do in
eight months what
prudently we
would normally
take a couple of
years to do."

Boston



BBS

A NEW

When Bank of Boston acquired BayBanks Inc., it took the unusual step of adopting the smaller bank's business strategies and IT systems

BALANCE

BY PETER FABRIS

WHEN CUSTOMERS OF TWO BOSTON BANKING rivals replenished their wallets on May 27, they found an unfamiliar sign on their ATMs. The Bank of Boston eagle was set against a swoosh of Kelly green, the color identified with its former competitor, BayBanks Inc. Bank of Boston had legally closed the deal with BayBanks 10 months earlier,

but on the Tuesday after Memorial Day weekend, the two companies publicly debuted their union with the new logo and a new name, BankBoston, on 1,000 signs at bank branches and ATMs.

Like the new logo and moniker, which incorporate elements of both banks' heritage, the systems serving the new bank's 2 million households and small businesses are a combination of both banks' technological strengths: Bank of Boston was expressly looking to own BayBanks' consumer banking brand image and market share—accomplishing that by mixing IT systems was both unique and difficult.

"This is the most significant project, the most significant amount of change that Bank of Boston has ever undertaken," says Bill Shea, vice chairman and CFO at the



Bill Shea oversaw the integration, Bank of Boston's biggest project ever.

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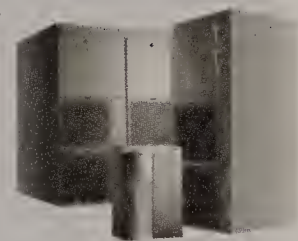
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Transactions in the Age of the Consumer

time of the integration and the executive who led the integration effort. This speaks volumes for a bank that, founded in 1784, has weathered the evolution of the New England economy from the Yankee clipper merchant trade in Boston and Salem harbors to the high-tech development of the Route 128 corridor.

Indeed, the project is one of the most ambitious bank merger integration projects ever attempted, according to David Sardilli, associate partner with Chicago-based Andersen Consulting. "What made it unique was how much blending there was of best-of-breed products, marketing techniques and systems from the two institutions," he says.

UNLIKE MOST BANK acquisitions in which the dominant bank swallows and digests the smaller one, Bank of Boston, whose \$50.8 billion in assets dwarfed BayBanks' \$11.8

The Urge to Merge

Merger activity in the United States rose to a record level in the first half of 1997. Announced merger transactions totaled \$366 billion driven by a surge in takeovers in financial service, technology and basic industry. Activity rose 16 percent compared with the first six months of 1996, when about \$314 billion in transactions occurred.

Worldwide, merger activity rose to \$692 billion in announced transactions, up 18 percent from \$588 billion in the first six months of 1996.

SOURCE: SECURITIES DATA CO.

billion, was intent on preserving and leveraging BayBanks' retail prowess and the IT systems that delivered this prowess to customers. "We at Bank of Boston were very focused on not destroying what we paid \$2.2 billion for," says Michael

R. Lezenski, chief technology officer and executive director of technology and systems services, the highest-ranking Bank of Boston IS managerial veteran.

Despite BayBanks' smaller size, its long-term strategy to provide innovative consumer products made it the standard-setter for retail banking in eastern New England. Services such as HomeLink, a home-banking service, and BayBanks' network of more than 1,200 automated teller machines, located in virtually every greater Boston neighborhood and suburb, were particularly attractive to Bank of Boston, says Nancy Bush, an industry analyst with Brown Brothers Harriman & Co. in New York. By contrast, Bank of Boston had only 350 ATMs. "BayBanks tended to be more cutting-edge with [consumer banking] technology," Bush says. Combining this consumer technology with Bank of Boston's strengths



The acquisition meant several sleepless weekends for Kevin Roden.

Controllable Mergers

Should you go together or go it alone?

WHEN TWO COMPANIES MERGE, shareholders and Wall Street analysts often have lofty expectations. But many mergers fail to deliver the full value anticipated during the fanfare surrounding the initial announcement, according to David A. Nadler, chairman and CEO of Delta Consulting Group Inc., a New York management consulting firm that specializes in change management, including the integration of mergers and acquisitions.

WHAT DOOMS A MERGER?

■ **A BAD CHOICE OF PARTNERS.** Sometimes the basic premise of the merger falls flat. When two companies with complementary strengths join, the odds of success rise. But, in banking, for example, when two weak institutions join together the result can be nothing more than one weak giant.

■ **POOR INTEGRATION.** Combining two organizations requires a lot more work than changing signs and company stationery. Business processes, culture and technology in the two organizations all have to be aligned. Performed badly, the nuts-and-bolts work of combining a company can make the merger fail even when the business strategies are in synch.

WHAT ARE THE POTENTIAL PROBLEMS?

■ **MANAGEMENT CONFLICT.** Executives must find common ground and align strategies or the merger will not deliver on its goals.

■ **LOSS OF KEY TALENT.** If a company acquires another to gain the expertise of a top-notch IS department, CIOs must persuade talented staff to stay.

■ **CULTURE CLASHES.** The goals and missions of the two organizations must be synthesized so that both workforces aim to achieve common goals.

■ **LOSS OF CUSTOMERS IN THE TRANSITION PERIOD.** In banking, for example, if the ATMs don't work or a snafu in a funds transfer system results in bounced checks, customers might take their business elsewhere.

"The integration is as or more important than the formulation of the merger itself," Nadler says. "The CIO is absolutely critical to the process, particularly in banking because banking is an information business."

—P. Fabris

in corporate lending and international markets would create a stronger institution and would justify what some analysts called an exorbitant price for BayBanks.

IS's charge was to provide the infrastructure for this best-of-both-worlds integration strategy. And Bank of Boston's IS department had integrated systems from 10 banks acquired since 1990. But this was by far the biggest acquisition. In fact, executives call it a merger despite the disparate sizes of the two institutions and the fact that Bank of Boston had purchased BayBanks' stock.

Despite its extensive prior experience with acquisitions, IS couldn't rely fully on past integration methodology. Previous projects had more to do with replacing the purchased bank's systems than preserving them. "That's how you do it fast," Lezenski says. But taking the easiest route wasn't an option. The new bank and its systems had to be better—not just bigger—because of stiff competition in the region. "This is a very challenging

market," Shea explains. "New England isn't growing like other parts of the country."

Mixing new development with an integration multiplies the risk of failure. But to deliver on the ambitious business strategy BankBoston was pursuing, IS had no choice.

To make the IT specs match the business strategy behind the merger, IS had to cross-breed some BayBanks systems with Bank of Boston systems. The merged institution wholly adapted some BayBanks retail systems, such as sales, but wasn't satisfied with all of them. "We took a look at what BayBanks did particularly well and at what Bank of Boston did particularly well," Shea says. "If we weren't happy with what either place did, we tried to do something new and innovative."

Competitive pressure forced an aggressive timetable as well. "We had to do in about eight months

what prudently we would normally take a couple of years to do," Lezenski says. A four- by six-

foot chart displayed in Shea's office diagrammed the interconnected processes and systems required to complete the integration. This "critical path" would take 10 months to complete, culminating on May 27, known as C-Day, or conversion day. Once set, that deadline couldn't be postponed easily. Federal banking regulations required BankBoston to give customers a 30-day notice if that date slipped. Rescheduling would have meant mailing thousands of postcards informing customers of the date change. While that cost would have been in the millions, Roden was more worried about the post-

cards as a tangible sign of IS failure. "The date was not as unmovable as, say, the millennium," says Kevin Roden, director of deposit systems and technology. "But there wasn't one person in the technology organization who wanted to send those damn postcards out."

To avoid those postcards, IS had to bend some dearly held rules. "We violated all of our guiding principles of how to do integrations quickly and effectively," Roden says. For example, IS would normally test systems sequentially, but there wasn't enough time for that. All testing had to be done in parallel. And not only did the integration have to be finished fast, it had to be done nearly flawlessly. BankBoston could not afford the consequences of a botched integration: pictures of angry customers in long teller lines on the local news. To avoid that calamity, combined systems would have to be thoroughly tested to handle increased capacity, and bank tellers and sales representatives would have to be well trained in the new systems.

THE FIRST STEP WAS deciding what to keep, what to trash and what to combine. Sometimes that was an easy call. BayBanks clearly had the superior ATM network. But in a few instances, IS had to create hybrids of the two banks' systems. For instance, Bank of Boston had completed two-thirds of a new sales platform system for its branches and telephone support center at the time of the acquisition. The missing piece was a component that aids sales reps in cross-selling products to customers. BayBanks did have an older system that fit the bill, although it lacked some desired bells and whistles. The big decision: Should they complete the Bank of Boston project along with all the other systems integration and related development work? The time constraint forced a com-

Susan Madden
monitored the
project to ensure
it stayed on track.





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promise: IS took the BayBanks component and plugged it into the Bank of Boston system.

Because BayBanks had superior retail, marketing and brand awareness, their NOW accounts, savings accounts and the like were kept mainly intact. Former Bank of Boston customers would receive new products largely based on former BayBanks' products; there would be no grandfathering of old accounts. That conversion meant that IS had to ensure that certain BayBanks' systems, such as sales, were connected properly to Bank of Boston back-end systems. A flawed integration might lead to embarrassing results such as customers' savings and checking accounts not being properly credited.

To support that strategy, IS had to overcome a major technical hurdle. BayBanks' back-end retail database systems would not be robust enough to handle Bank of Boston customers. That meant hooking BayBanks' front-end retail systems to Bank of Boston databases, a task that required extensive development work before the systems could be integrated. That strategy is fraught with risk. "Most people would tell you don't ever put new development on a critical path to an integration because it increases risk exponentially," Lezenski says. But with the ambitious business strategy, IS had no choice but to stand and deliver.

Parallel rather than the preferred sequential testing was another headache. That strategy required around-the-clock testing including weekends for two months. IS rooted out bugs that could have prevented customers from withdrawing cash from ATMs. The pace became even more frantic as the project approached C-Day. IS had to do 12 weeks' worth of testing in two weeks, Lezenski says. The demands on technicians and managers were enormous, forcing them to put their personal lives on the shelf for months. And that didn't go unnoticed. "This integration taught me a lot about our people," Roden says. "The dedication was phenomenal." It was also essential because the

unconventional testing methods wouldn't have worked without it.

Roden's technicians used past testing schedules from Bank of Boston's previous integrations to estimate how long it would take to fix code defects. It was essential that testing teams immediately notify Susan Madden, director of project and customer services, of any defect that would throw the critical path off track and put the target integration date in peril. Madden's job was to monitor the project and coordinate efforts to make sure the bank could meet its integration target date. "There were a couple of points where the date was in jeopardy," Madden recalls. "The key to getting those crises resolved was making sure everybody got together in the same room to talk face to face."

Shea and Madden kept the project on schedule and the landmark Memorial Day weekend finally arrived. In preparation, every BayBanks branch site was retrofitted with new hardware and rewired for data and voice systems. "Designing [the branch systems] was not so tough," says Lezenski, "but implementation across 500 locations in a compressed period of time was a real logistical challenge." In preparation for the big weekend, IBM built prototype branch environments for BankBoston in its Charlotte, N.C., lab weeks before the big weekend. Big Blue then shipped the prototype environment to each branch and installed it.

JUST AS NO ONE WANTED TO send postcards, no one wanted to irk customers with long lines when the new bank opened. Just-in-time training for branch personnel, therefore, was essential. Bank of Boston veterans had to adjust to BayBanks' software and BayBanks natives had to become familiar with Bank of Boston's hardware. With combined forces, BankBoston would boast over 350 branches with approximately 2,500 tellers, sales reps and managers at each when it opened for business. Staff underwent crash

Two Become One

Company: BankBoston

Principal Office: Boston

Asset Size: \$66.1 billion

- **Nearly 1,000** people worked on the project from July 1996 to May 1997
- **50 computer systems** involving 8,000 separate tasks were changed
- **9 major suites of systems** from both banks were converted to 1 common BankBoston system
- **43 separate business plans** were created encompassing 4,800 tasks
- **15 operation plans** were created encompassing 4,800 tasks
- **Over 2 million customized pieces of mail** were distributed to consumer and small business customers regarding merger issues
- **Nearly 8,000 signs** at almost 1,500 locations in 4 New England states will be changed
- **2,000 jobs** were eliminated, 1,600 of those through an early retirement program and attrition
- **5,000 staff members** underwent training in new BankBoston products and services at 33 separate locations
- **1 out of 3 households** in eastern Massachusetts and 1 out of 4 small businesses in Massachusetts, New Hampshire, Connecticut and Rhode Island will be affected by the merger

SOURCE: BANKBOSTON

training over Memorial Day weekend on teller platform and retail sales systems so that they could open new accounts and provide other services for customers. On C-Day, much of the public perception of the conversion would depend on how well branch personnel applied their training. The more efficient they would be with systems, the shorter the lines would be.

On Memorial Day, a bank holiday, the pace was frantic. Workers

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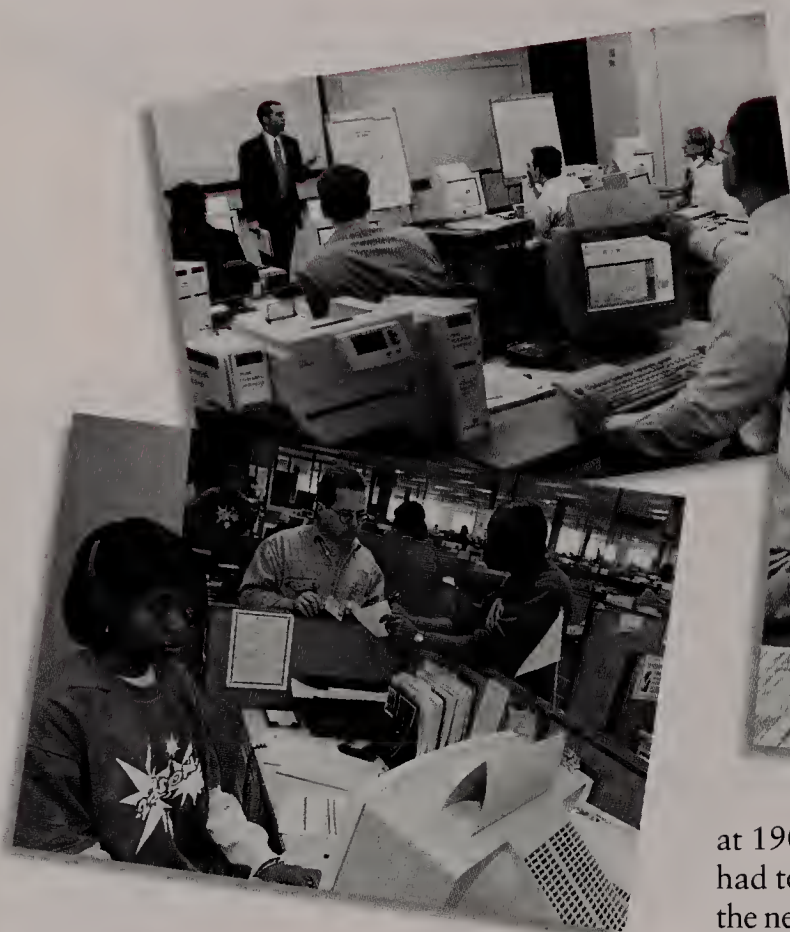
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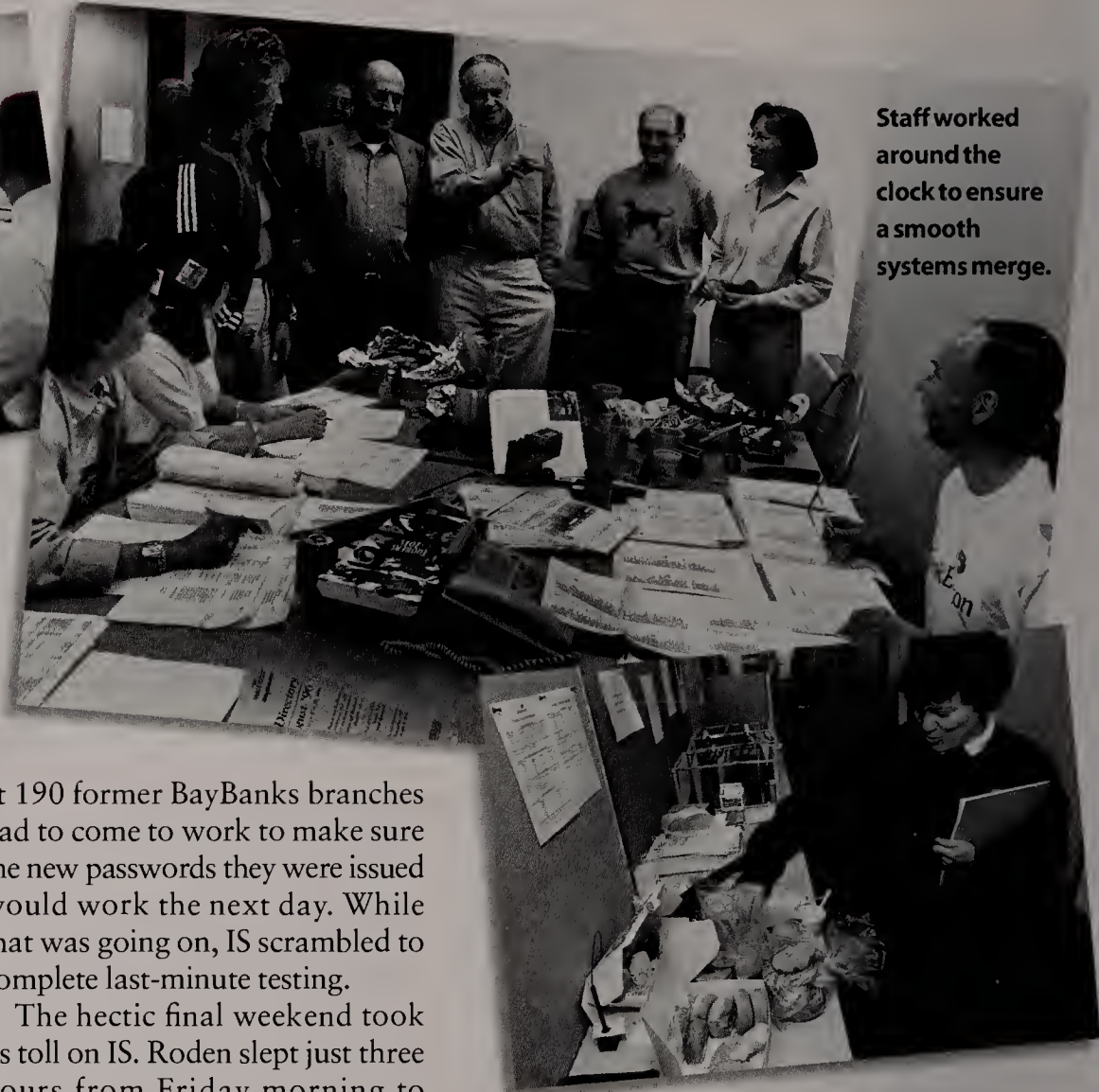


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**"We at Bank of Boston
were very focused on not
destroying what we paid
\$2.2 billion for."**

—Michael Lezenski



Staff worked around the clock to ensure a smooth systems merge.

at 190 former BayBanks branches had to come to work to make sure the new passwords they were issued would work the next day. While that was going on, IS scrambled to complete last-minute testing.

The hectic final weekend took its toll on IS. Roden slept just three hours from Friday morning to Sunday afternoon as he supervised last-minute testing on operational databases. Sleep deprivation was the norm for all workers

that weekend. Roden didn't expect C-Day to go off without a hitch. It didn't. Anticipated performance problems with both batch and online systems surfaced. "There was no way to test the whole thing [in advance] with live customers," Roden laments. As his team anxiously monitored systems on C-Day, they noticed that

response times for branch platform and telebanking support systems lagged to five seconds. That wouldn't cut it. Roden's team tweaked the database code Tuesday evening and reduced response rates from five seconds to subseconds, faster than either bank had ever achieved, which "is astounding," according to Roden.

Overall, IS leaders were amazed at how smoothly the conversion went given the enormity and complexity of the project. The quick-study training over the weekend for tellers and retail sales reps paid off. "Most people were 50 to 80 percent as efficient as they had been the Friday before when they were operating with what they knew," Roden says. Fears of being pilloried in the press were alleviated. Still, Roden looks back on the project with a sense of disbelief. "There were situations where I said 'Oh my God, we're nuts,'" he says. "We had those quite a few times." But they survived a project that they might just tell their grandchildren about someday. After some mop-up work over the two weeks following C-Day, dozens of IS workers headed for the beaches of Cape Cod and the mountains of northern New England for well-deserved vacations. **CIO**

Staff Writer Peter Fabris can be reached at pfabris@cio.com.



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Putting the LAN in the Can

When food giant Cargill Inc. mandated IT standards to streamline business, a regional office directing operations across two continents solved a few problems that sprouted up

BY MARSHA JOHNSTON

THE BUSINESS OF AN INTERNATIONAL PROCESSOR and marketer of agricultural and industrial commodities can be as varied as milling wheat in Russia, producing seed products in Africa and monitoring coffee bean harvests in Costa Rica. Managers must cope with weather and natural disasters, coups d'état and environmental activists as well as tariffs and regulations.

Imagine trying to manage such a business without a common information technology infrastructure.

Minneapolis-based Cargill Inc. did it laudably for many years. Since 1865, to be precise. But not anymore.

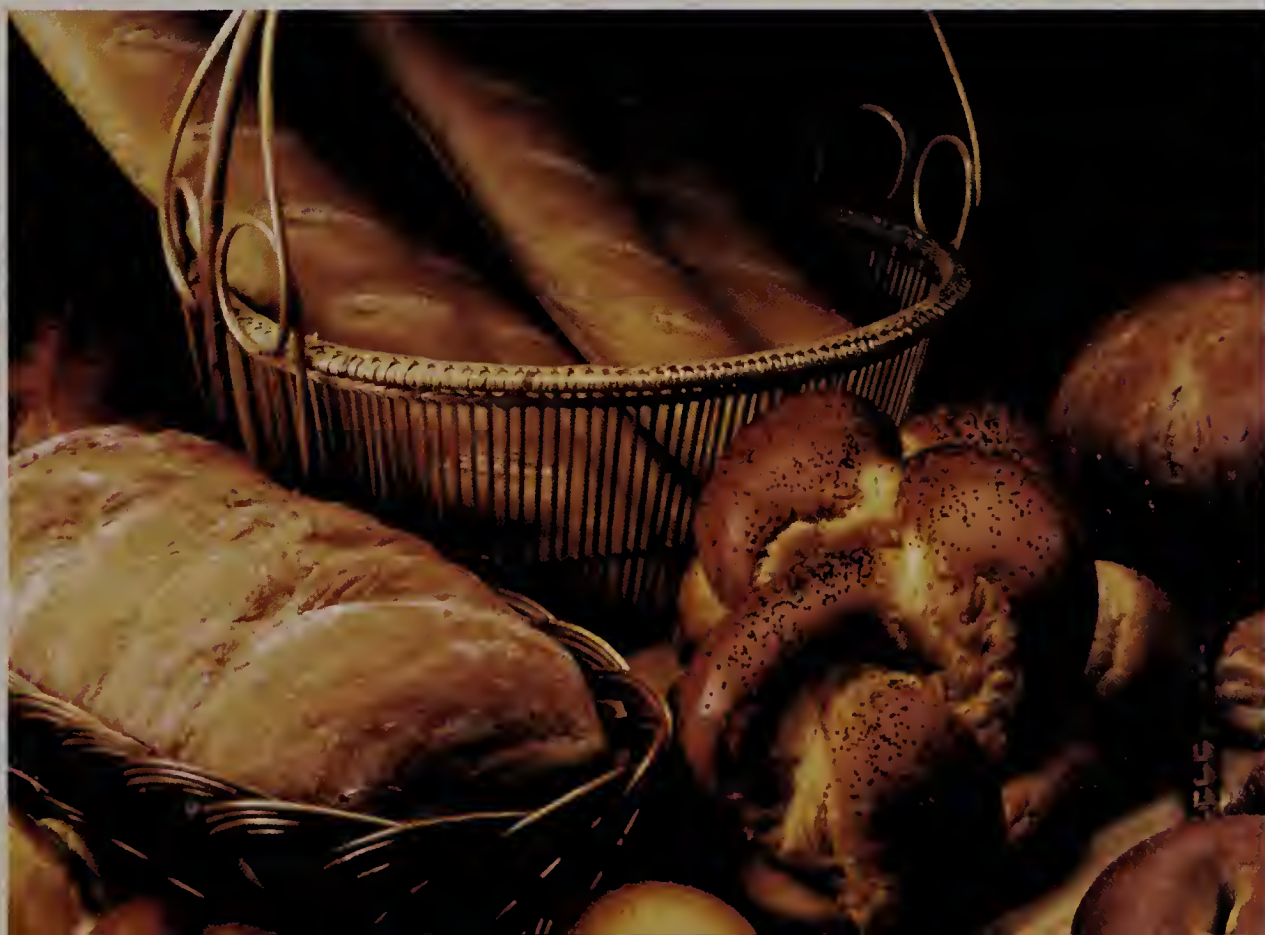
Mushrooming via acquisitions and organic growth in the early 1990s, Cargill executives decided in mid-1993 that its IT operation was not in the best shape to serve the global reach of its multiple businesses. Because IT managers made decisions based on personal preference and pressing needs, "we probably had everything that was out there," according to Bert van der Plas, European information technology manager.

Reader ROI

I.T. INITIATIVE AT THE REGIONAL level can sometimes improve on a corporate-level systems mandate. Learn how Cargill Europe

- ▶ Created the "LAN-in-a-Can"
- ▶ Reduced rollout cycle time
- ▶ Adapted systems to accommodate changing political and commercial environments

PHOTOS COURTESY OF CARGILL INC.





Bert van der Plas
*pruned the number of
Cargill's e-mail systems.*

**LAN-in-a Can
would be
Cargill
Europe's
approach to
implementing
Cargill's
Global Office.**

In fact, throughout the world Cargill had 16 different e-mail systems as well as three WANs, a hodgepodge of office tools and an outdated computing infrastructure that made communication between countries difficult. And only about 30 percent of the company's employees were using PCs. "It was really not very efficient, especially for a company that is so dependent on communications," says van der Plas.

For example, when Andrew Thomas became divisional finance director in July 1994 for Cargill's Liverpool-based cotton trading division, Ralli Brothers & Coney, he discovered that practices hadn't changed for generations despite massive shifts in the cotton industry. For example, Ralli could no longer buy from each cotton-producing country's state-owned selling organization because state-owned organizations were being supplanted by multiple, privatized producers. At the time Thomas arrived, the 146-year-old company acquired by Cargill in 1981 had only "a small number of PCs, an archaic computer system and a low level of IT literacy," Thomas says. Ralli was inundated by an avalanche of faxes and courier pouches, a paper-based system that caused delays and transaction errors when information was reentered or repeatedly transcribed. "We really needed to establish operations in those [newly privatized] countries, with high-tech communications and data transfer capability to the Liverpool office," Thomas says.

Enter Cargill Global Office (CGO), headquarters' solution to making life easier for its business units.

Headquarters' Solution

The initial and biggest impetus for CGO among managers at global headquarters was the desire for some commonality in Cargill's different e-mail systems, explains Steve Morton, European computing

infrastructure manager. Cargill's corporate finance department knew CGO was imperative for the growth of the company; it also authorized the CGO project to replace legacy systems from various vendors with a more homogeneous client/server-based system. But the European office found it hard to quantify significant cost benefits to replacing only e-mail. To justify the project to Cargill's accountants, the European management added office automation applications to CGO's mandate and calculated further business benefits, such as being able to exchange complex documents and reducing paperwork and manual tasks. "Globally, this meant a substantial investment—new hardware and software for over 23,000 users and an enormous effort from IT staff all over the world," says van der Plas.

To implement CGO worldwide, Cargill headquarters took two different approaches. In line with the original goal of having e-mail systems around the world operate on a single platform, an HP Open Mail server was built in one iteration in Minneapolis and delivered to Cargill's four regional offices in North America, South America, Europe and Asia Pacific. But for the rest of CGO's desktop environment, the Minneapolis office simply provided each of Cargill's four regions a list of the approved software, hardware and networking products to be used at the desktop and server level. Armed with the product list, each region's imple-

Company Profile

Cargill is a privately held international marketer and processor of agricultural, financial and industrial commodities

- **Employees:** 76,000+
- **IS Staff:** 1,500
- **Facilities:** 1,000 in 66 countries
- **Net Worth:** \$902 million (1995-96)
- **Revenues:** \$56 billion (1995-96)

Cargill Europe

- **Employees:** 13,000
- **IS Staff:** 250
- **Facilities:** 108 in 10 European Union countries (Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain, United Kingdom), nine non-EU countries (Hungary, Kazakhstan, Poland, Romania, Russia, Switzerland, Turkey, Ukraine and Uzbekistan) and 11 African countries (Egypt, Ethiopia, Kenya, Malawi, Morocco, Nigeria, South Africa, Tanzania, Uganda, Zambia and Zimbabwe).

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Andrew Thomas
bailed Cargill's cotton
business out of paper
communication.

Anatomy of a System

Cargill Global Office

- Novell Inc. NetWare 3.12
- Microsoft Corp. Windows 3.11
- Lotus Development Corp's SmartSuite
- Hewlett-Packard Co.'s Open Mail
- IBM Corp.'s Time and Place global calendaring
- Hewlett-Packard Co.'s Global PhoneBook
- Blue Links' AS/400 Emulator

To create "LAN-in-a-Can," Cargill Europe added

- Lane Message Server for faxes and telexes
- Lotus Notes
- Netscape Communications Corp.'s Navigator
- Microsoft Project Manager
- FIMI Inc.'s Prophet, a news and quotes analysis business support package

mentation was left to the responsibility of the project leader and ultimately the regional IT infrastructure manager.

Van der Plas, Morton and the IT team at Cargill Europe headquarters in Cobham, England, received the CGO announcement with elation because it validated work they had already done to justify the computer systems in their offices. They knew they were on the right track because the CGO list contained many of the same options they had already settled upon. "CGO gave us the opportunity to fundamentally change the core and increase functionality of the old infrastructure—particularly its interoperability," says Adrian Peak, European infrastructure projects manager.

But then Morton, Peak and Evan Venn, European client/server architecture manager, realized that additional benefits could be obtained by further reducing variables. If the detailed construction of the workstations and servers were also specified and replicated, it would be far easier to ensure that all of Cargill Europe's eventual 4,000 desktop, 800 laptop and 100 server users in 100 locations in 28 countries would have an identical system backbone. And without this uniformity, chaos was likely to ensue.

They decided to take CGO further than headquarters had mandated.

One Step Further

"We wanted a predictable, replicable environment because we have locations with no IT support and where IT service provision is poor," Morton says. "If we had just let the European offices each put in the SmartSuite

and Novell servers, they all would have looked different. We couldn't have been sure to be able to plug in a French client in the U.K. office, or that an upgrade done here would not crash into a smoking heap in Turkey."

Morton's group, which included Peak and Venn, started by cutting headquarters' approved vendor hardware list for desktop systems from three options to one—IBM. Then, to get a truly homogeneous, interoperable system for all European offices, they decided that Venn and his associates would build, in a LAN-based common operating environment, all of the CGO-mandated desktop applications, including approximately 500 software components along with the operating system. The same was done for the servers. The single set of software, which eventually was named LAN-in-a-Can, would be Cargill Europe's approach to implementing CGO. Venn would put the entire system on a digital audio tape (DAT) cassette that could be installed swiftly.

NET BUSINESS: COLLABORATION, CO-OPETITION & PROFIT

Moderator
Tom Davenport

Industry Experts
Don Tapscott
Dave Barry
Tim Carter
Tim Horgan



DECEMBER 7-10, 1997

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Don Tapscott

Keynote Presenter

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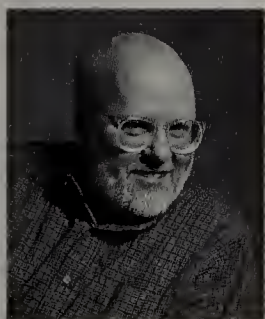


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sharing more
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—Andrew
Thomas

One problem persisted: "The major challenge was getting the IT managers' buy-in. This was a major change in culture from the previous situation where people used local tools and built and maintained their own servers and clients. My end users don't care how Novell is configured, but my IT pro sure does because he or she always believes they have the best way," says Morton. To help get Cargill Europe's systems professionals to support the change in procedure, Venn and Peak solicited them for input on how best to implement the system, and Morton announced that he ultimately would give them Europe-wide responsibility for managing pieces of the new environment.

On several visits to regional IT offices, Venn delivered tapes or diskettes with the latest iteration of LAN-in-a-Can to the local IT pros for evaluation. "They would send us back their enhancements and we would use the best ideas," Venn says. For example, he continues, "there was no provision in CGO for a language overlay." So when one of the system engineers in Spain wrote a few lines of script that allows a user to click on an icon and change Lotus 1-2-3 to Spanish, it was made part of the entire project. "We pored over the technical, legal and cultural particularities of each country," says Peak.

After the consultations, Venn's team added applications to the CGO environment (see "Anatomy of a System," Page 72). Venn also took the initiative to negotiate changes in CGO's standard software products in order to make the LAN-in-a-Can environment work optimally. He worked particularly closely with Novell, changing certain protocols to better fit Cargill Europe's strategy. As a result, Cargill Europe has become a major beta site for Novell.

"The complexity of LAN-in-a-Can was to create a system that would work for all of Europe and gain acceptance for using it," Morton said. The approach, says van der Plas, represents how "we in Europe have gone a step further than the other Cargill regional offices." For his efforts, Venn became the first IT professional and the first European to win Cargill Inc.'s coveted Technical Achievers Circle award.

Bottom Line Results

Since Cargill Europe's implementation of CGO became operational at the end of August 1996, one month ahead of the corporate deadline, some tangible improvements in its system support costs and



*Steve Morton's team
cultivated standards that
grew across a continent.*

related IT investments are evident. "Our support ratio—the number of users per support person—is about 20 to 25 percent better than that of the rest of the company," says van der Plas.

Cargill Europe's reduced need for support began with the installation of LAN-in-a-Can, Venn's packaged version of CGO, van der Plas notes. Quite simply, Cargill Europe's offices installed CGO automatically with little or no IT support. They plugged in the DAT cassette containing the final version of CGO, and within hours every office was running exactly the same network as that at Cobham. Now, with all offices running the same system, Cargill employees can transfer files more easily and communicate between offices without having to relearn computing skills if they move to a new office.

Ralli, the first Cargill Europe division to implement CGO, has certainly remained enthusiastic. "Having installed this system opens your eyes to the potential of technology. People's work practices have changed; they are keeping their own spreadsheets instead of old ledgers, and they are communicating electronically instead of by fax. A more efficient workplace has been created; we're sharing more information," Thomas says.

Rollouts of system upgrades have become a snap as well. "If we want to make a change to the model, we make it, test it once and roll it out to Europe's 100 locations instead of having to test in 100 locations," van der Plas says. Even a potentially major change such as replacing Windows 3.11 for Windows NT 3.51 is being rolled out without any user reeducation, Venn adds. "With the new infrastructure, we can implement NT from a CD in eight



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A Techie among Techies

IT takes the prize

CARGILL'S ANNUAL TECHNICAL Achievers Circle award goes to a technical employee who has made a contribution of fundamental value to the company's business. The competition is stiff because cocoa processing superintendents, quality control engineering managers and seed breeding researchers present a broad array of expertise and because employees must win at the regional level first.

Established in 1989, the award criteria include technical innovation, positive commercial impact, commitment

to technical excellence, continual improvement, curiosity and initiative, perseverance, teamwork, inspiration and leadership.

The winner receives a Swiss-crafted Atmos timepiece powered by slight changes in atmospheric temperature. A change of one degree will run the clock's mechanism for three days. Cargill executives chose the clock for its sophisticated technology, the kind of sophistication that they say embodies the principles of the Achievers Circle.

Upon receiving the 1995-96 corpo-

rate Technical Achievers Circle award, Evan Venn, European client/server architecture manager, says he was "quite surprised to get it; it glued me to my seat, really, because I had met all of these brilliant research scientists in the United States who were also nominated." Despite being the first IT employee ever to win the award, Venn is modest about why he won: "I guess it was because we rolled out something on time and people are happy with it."

—M. Johnston

Evan Venn cooked up a recipe for system success.



to nine minutes with a production-line approach, and the only change the user sees is that the log-on is different," he says.

Most important, however, the new infrastructure has made possible many other previously impossible IT projects, such as Internet/intranet and EDI development, and centralizing treasury and cash management for Europe in the United Kingdom. Van der Plas says Cargill Europe implemented an intranet for the cost of only a couple of servers.

Van der Plas acknowledges that many of the benefits of infrastructure projects such as CGO and LAN-in-a-Can are insufficiently tangible to appear

on a ledger. "How do you measure that a trader in Singapore does a better deal because he got information more quickly? Or that we have better relations with our clients? Are we measuring [ROI] in detail on a worldwide basis? No, that would be impossible," he says.

Certainly, one of the best signs of success is whether a project is imitated. Even though CGO applications were successfully implemented on time around the world, the Minneapolis office in 1997 would like to improve its global set of applications by launching a common operating environment project similar to LAN-in-a-Can. The Workstation Infrastructure Support Environment (WISE) project is designed to provide Cargill's regions the kind of cost-effective, efficient deployment and reduced support and maintenance costs that Europe has achieved.

A member of Venn's team is working on the project in the United States, which could make WISE quite similar to Venn's award-winning common operating environment. Nevertheless, Venn knows the system can always be improved. "We will adopt the WISE project within our environment to get economies of scale, running the resulting single system worldwide," he says. "Things look pretty rosy actually." **CIO**

Marsha Johnston, a freelance writer in Paris specializing in telecommunications and information technology, can be reached at johnston@club_internet.fr.

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HABITS OF THE LETHAL CONSULTANT

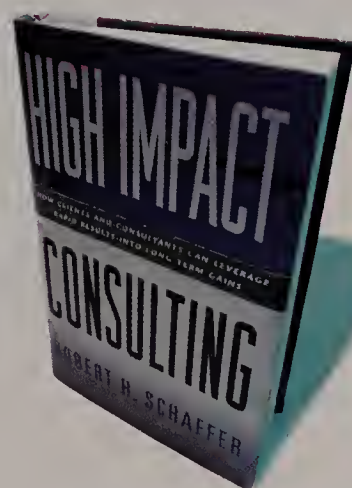
Five fatal flaws doom most consulting assignments.
Learn how to recognize and avoid them.

BY ROBERT H. SCHAFFER



How many times have management consultants come into your organization full of high hopes and pledges, researched and analyzed, and then delivered a complex, brilliantly conceived solution that ultimately had no impact on your business? Who failed? The consultants? You, the client? In *High-Impact*

Consulting: How Clients and Consultants Can Leverage Rapid Results Into Long-term Gains, published this spring, Robert H. Schaffer asserts not only that such failures occur with great frequency but that client managers unwittingly collude with their consultants to perpetuate the high failure rate. In the edited excerpt that follows, Schaffer discusses the flaws and how to reverse them to achieve a higher consulting success rate. For information systems executives, the lessons are doubly applicable



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because consultants and CIOs have much in common. Just like consultants, CIOs succeed only if internal clients achieve better results as a consequence of their contributions. Otherwise, no matter how "excellent" their solutions, they have failed.

The Fatal Flaws

The work of professional consultants usually proceeds more or less in this same time-honored fashion:

- First, client managers describe their needs, and the consulting experts propose how they will help.
- Once the client gives the go-ahead, the professionals do the research, conduct interviews, analyze the organization, design the new systems and develop the new processes or recommendations for change.
- Once the professionals have delivered the result of their work, they have fulfilled their commitment. Now it is the client's job to exploit the experts' products and (with or without additional support) to achieve the improvements that were their initial goal.

This classic pattern has five intrinsic characteristics that I refer to as the "frequently fatal flaws." Not every project is marked by all five flaws, but even three or four can block the path to success.

FATAL FLAW



Projects are defined in terms of the consultant's expertise or products, not in terms of specific client results to be achieved.

No matter what goals the client may have in mind when engaging a consultant, it is unlikely that the consulting project will be defined in terms of achieving those goals. Rather, the project will be defined in terms of the work the consultant will do and the products the consultant will deliver. Of course, the assumption always is that the consultant's deliverables will eventually be translated into the client's desired results. But that is only an assumption; it is rarely part of the contract.

I'll refer repeatedly to an example that profiles an internal IS department acting as the consultant for internal user clients. But the flaws apply equally well to an external consultant called in to advise a business. Consider a multi-plant office products manufacturer with six regional warehouses throughout the United States. The company had almost twice as much inventory as was theoretically needed. Even so, it was unable to meet customer orders promptly, a matter of the wrong inventory or the right inventory in the wrong place. Senior management agreed that a solution would require better information and better control. The head of the company's IS function agreed that within the next 18 months her group would create an overall inventory control system to replace the current system. It would, she said, make it possible to tie manufacturing order quantities directly to predicted demand, and it would also provide more timely information about the state of various categories of inventory.

Even though inventory reduction was understood to be the ultimate goal, the specified goal of the project was to create a system and not to achieve such a reduction. By defining projects in this way, client managers allow their professional experts to avoid accountability for improved performance results.

FATAL FLAW



The scope of projects is determined solely by the subject to be studied or the problem to be solved, ignoring the client's readiness for change.

When experts are asked to recommend changes to some aspect of a client's organization, they begin by focusing on the system or process they have been asked to deal with: How is it working now? What is working well? What is not working well? How do the elements fit together? What might a changed or improved system look like? Such questions result in projects that are almost always designed completely around the subject to be studied, the problem to be solved or the system to be installed, with the assumption that the consultant, applying his or her expertise in a particular area, will uncover the best solution. In designing a project, consultants rarely consider what kind of changes might be recommended at the

**ONLY AT THE END OF A PROJECT
do the client's motivations and
capabilities suddenly become
a matter of concern.**

completion of this study, the likeliness that the client will want to carry out those recommendations or the capability of the client to make those changes successfully. Only at the end of a project, when the consultants are ready to make their recommendations, do the client's motivations and capabilities suddenly become a matter of concern.

For example, in the office products company cited above, after about a year of work on the new inventory system, it became clear that it would not lead to substantial reductions in inventory nor to improvements in customer service. The reason? The sales, product management and manufacturing functions simply couldn't agree on how to develop a common attack, a critical readiness factor overlooked by IS.

FATAL FLAW



Each project aims for one big solution rather than for incremental successes.

In the office products case, with a more narrowly focused effort, management may have been able to gain control over one category of inventory or one product line as a modest first experiment. Such a step was not considered, however. Why? Once a need or problem is defined by a client, most consultants are geared to studying it in its totality and offering a complete

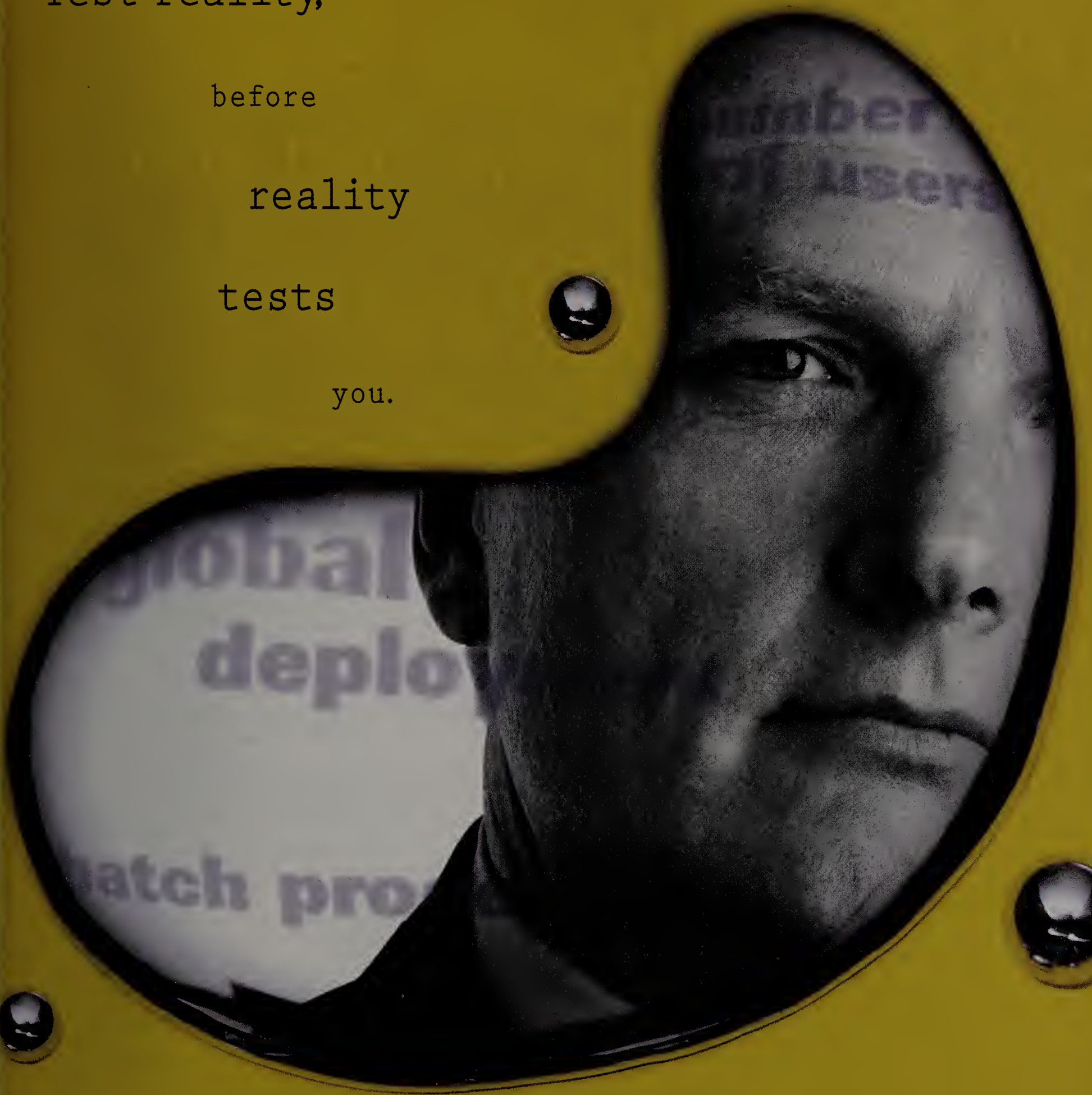
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remedy. The aim is to go as far as possible toward having the problem fully diagnosed and solved or a complete new system in place at the end of the project.

Another result of this flaw is that projects often end up taking many months from the start until the consultant delivers the system or the recommendations. While the project inches forward, month after month, adhering more or less to its original design, the organization moves on. The external world continues to change. Management priorities shift. Management personnel may change. All of these shifts affect what might work. Yet, like a glacier moving down the mountain, the project grinds forward toward its predetermined destiny.

FATAL FLAW

4

A sharp division of responsibility rather than a partnership exists between client and consultant.

In the office products example, the IS people developed and installed the system, and the operating managers simply waited for delivery. When the system was installed, they used it as best they could.

This illustrates how responsibilities are handed off, back and forth. The more work the consultant carries out without close client involvement and the longer the cycle time from start to finish, the greater the likelihood of missed connections, of recommendations that call for actions that are much too complex for the client to comprehend or carry out.

FATAL FLAW

5

Projects make labor-intensive instead of leveraged use of consultants.

This flaw is the inevitable consequence of the other four flaws. When the goal of a project is to arrive at "the best answer" (or create a "new system"), and it is agreed that this will require a comprehensive study, and it is understood that the consultants will do the bulk of the work, it shouldn't be surprising if the project involves many consultants working long hours.

In the office products case, the notion that a total new inventory management system was to be created by IS gave rise to a costly, long-term and labor-intensive project.

Consultants working on project tasks by themselves without transferring knowledge to client personnel and without engaging client personnel in the work of the project is the essence of labor-intensive consulting. It overlooks the gains that are possible if the consulting effort is leveraged by having client people learn from the consultants and assume increasing amounts of the work.

Many consulting firms and internal consultants such as the IS department recognize that the conventional mode is not a good way to work. They may even make some attempts to get their clients involved in project work. The great majority of consultants, however, seem to be unwilling or unable to depart from the conventional, labor-intensive consulting model. The alternative, which

I call high-impact consulting, offers clients more assurance of success.

Reversal of Fortune

As we have seen, the conventional paradigm is not designed to mobilize organizational change. High-impact consulting, by contrast, focuses on achieving results as much as on discovering the solutions. The approach contrasts sharply with conventional consulting because it reverses the five frequently fatal flaws of the conventional mode and transmutes each flaw into a risk-reducing, return-enhancing element.

REVERSAL 1

Instead of defining projects solely in terms of the systems, reports or products that the consultant is going to deliver, projects are defined in terms of specific performance goals that will be attained.

REVERSAL 2

Instead of project scope being determined by the logic of the subject matter being addressed, project scope is based on an assessment of what the client is able to actually do.

REVERSAL 3

Instead of a one-big-solution modality requiring long cycle times and huge upfront investments, projects are divided into rapid-cycle steps for rapid results.

REVERSAL 4

Instead of shifts of responsibility between clients and consultants, both parties work and



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REVERSAL 5 Instead of the labor-intensive employment of teams of consultants, consulting inputs are highly leveraged.

By reversing each of the five flaws of conventional consulting, high-impact consulting creates a low-risk, rapid return developmental process. Each project is designed not only to produce some tangible results but also to expand the capability of both client and consultant to tackle increasingly ambitious projects with increasing competence.

The following exemplifies high-impact consulting in action:

An aluminum processor had invested large sums over a five-year period in consulting help and then in the purchase of automation equipment and the software to run it. The aim was to multiply the output of the company's rolling mills, but the resulting productivity gains were only a few percentage points a year.

An external consultant was hired to collaborate with an internal consultant to address the need for greater productivity. A group of mill operators and supervisors was invited to help the company reap greater benefits from its systems and hardware investment by further increasing the rolling mill's throughput.

In a series of brainstorming sessions, the consultants tuned in to the participants' resistance to improvement as well as to the participants' ideas for achieving it. The consultants encouraged senior management to respond to a number of "hidden agenda" items that surfaced.

Once management had met with the team of mill personnel and dealt with a number of their questions, the group agreed to shoot for a 15 percent gain in six weeks. The team ran the project. It was made very clear—by word and deed—that the consultants were there to provide methodological help as needed but were not in charge of the project. All members of the team were encouraged to contribute their ideas. By the end of the six weeks, productivity had actually increased by 17 percent—five or six times the amount gained over the previous several years. And this level was not only sustained in subsequent years but actually increased to higher levels, again without further capital investment.

At around this same time, company management decided to take action to improve their on-time shipment record, which was down around 80 percent. They were about to engage a consultant to recommend and install an order-tracking system at a cost of \$2 million.

The company's experience in the rolling-mill productivity project suggested that a purely technical solution might not solve the late shipments problem. So the company postponed the systems study and asked the same external consultant to help it shoot for some rapid results on the on-time shipments problem.

In collaboration with several internal consultants, the external consultant proposed and then helped carry out the following pilot project, without making any changes

in the information system. The mill managers agreed to try, with some consulting assistance, to ship 100 percent of orders out during a one-week experiment by "doing everything right." One month of preparation was scheduled before the trial week. The managers were not asked to commit to maintaining that level of service after the one-week experiment. Employees in every department were asked to help prepare for the experiment, and everyone's ideas were welcomed.

During the one-week pilot (and the following week, too) every order was shipped on time. Thereafter, delivery performance never fell below 95 percent. This experiment clarified the nature of the information systems improvement that would work best. And it was planned and carried out—at a cost well below \$2 million. The experiment also made clear that, if management had proceeded with the original plan, without the operational lessons, the effort would have been a total failure.

If a consulting project is aimed at rapid-cycle, measurable results and the client and consultants collaborate to make it happen, the number of consulting hours nec-

THE TEAM RAN THE PROJECT.
It was made very clear—by word and deed—that the consultants were there to provide methodological help as needed but were not in charge of the project.

essary is greatly reduced. A principal objective of high-impact consulting is to help clients make better use of their own talents and skills. With this perspective, and with greater emphasis on achieving results and less on producing voluminous studies, consultants need do much less because the client accomplishes so much more with what the consultant provides. Therefore, high-impact consulting is also high-leverage consulting.

A drastic reduction in consulting costs is only one of the benefits of high-leverage consulting. At least as important is the implied message to everyone in the client organization: "This is our project, and we are the ones who will have to make it succeed, with the help of the experts." Managers accept the reality that they must learn about and contribute actively to the system being installed. The zest that this sense of personal responsibility inspires contrasts markedly with the malaise and cynicism that is aroused when 20 or 30 consultants are scampering around, poring over files, calling meetings and making notes while the organization's managers carry on with the daily work. As consultants and clients plan and execute projects in ways that leverage the costly consulting inputs to maximum effectiveness, they will discover that limited consultant input can go a long way when the client is prepared to absorb and use it. **CIO**

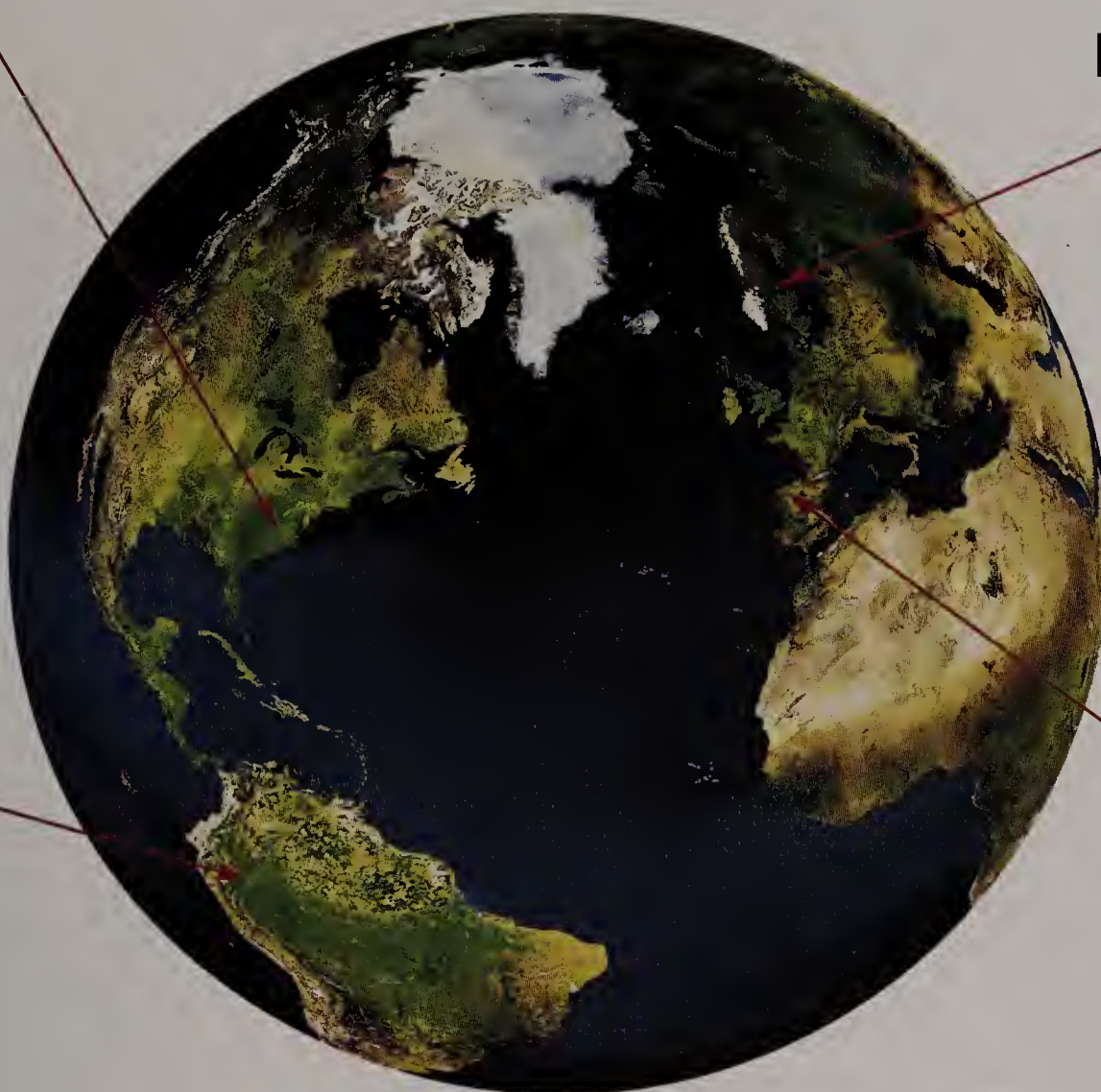
Robert H. Schaffer heads the consulting firm of Robert H. Schaffer & Associates in Stamford, Conn.

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Cognetics Corp.'s Charles Kreitzberg tells software developers that to stay competitive, they have to make user-friendlier products

BY MEGAN SANTOSUS

AT 16, CHARLES KREITZBERG was the proud recipient of a music scholarship to a summer arts program at Dartmouth College. On his first night there, he locked himself out of his dorm room. Wandering around the campus, he stumbled upon a basement room bustling with activity. "In that room I saw my first computer," recalls Kreitzberg. "It was an enormous chartreuse General Electric machine that filled the room with blinking lights." With that serendipitous introduction, Kreitzberg was hooked on computers. He spent that summer teaching himself programming—at the expense of attending orchestra rehearsals—and went on to pursue degrees in computer science and psychology.

Kreitzberg has left his French horn behind and today is president of Cognetics Corp., a Princeton Junction, N.J.-based software and application design company. When not running Cognetics, Kreitzberg is likely to

Charles Kreitzberg: *Though he's kept the French horn he got in high school, it fell out of favor when he discovered computers.*



be out preaching the gospel of improving software's accessibility. "One of the problems with computing is that programs are not easy to use," he explains. As a result, he says, the productivity gains that computers promise have not been realized fully. To promote the concept of what Kreitzberg calls user-centered software design, he has started the Lucid Computing movement, a nonprofit, dues-free group open to anyone interested in making software easier to use and less expensive to develop.

CIO: What is the philosophy of Lucid Computing?

Kreitzberg: Software is just too difficult to use for both cultural and technical reasons. Now computers are essentially a mass-market item; they are on everyone's desk and in people's homes. And through the Internet, companies are hoping to link with consumers and even conduct commerce through these computers. It's essential that people feel competent and comfortable using these machines. [Research shows that] only about one-third of the people

who use computers are comfortable with them. We haven't broken that usage barrier, and it's having serious effects on both end users and software development. That's what I want to attack with Lucid Computing. At the heart of the movement is the idea that user-centered design should be integrated into all phases of the system development process.

What are the elements of user-centered design?

It's essentially an analytic process that

looks at the structure of the overall workflow or system, which activities the user is performing within the whole work process and how the user would relate best to the software. After that, a design is prototyped, reviewed, refined and used as part of the technical specification. Although the code for the user interface is about 30 percent of the total programming code, the design of the user interface typically is not subjected to [the] rigorous [testing] that we tend to do on the back end with code or actual processing software. Instead of being treated as a separate and critical



You have to educate your own programmers, systems analysts and software engineers to understand that users are not excess baggage, that serving them is the goal.

design task, the user interface is lumped into the overall design in an ad hoc manner. That's because, from a technical point of view, [interface design] is not seen as particularly challenging. Yet in order for software to be easy to use, development has to incorporate what I call usability engineering upfront. Usability engineering is strongly related to, but distinct from, the systems engineering process that is used to design the remainder of the software.

Why should CIOs care about user-centered design and usability engineering?

If companies understood how much money they were wasting due to bad design, they would develop software in a very different manner. Thomas K. Landauer's studies [discussed in his book *The Trouble with Computers*, MIT Press, 1995] have revealed that the average software GUI has 40 design flaws. Correcting the most superficial 20 of the flaws will boost the efficiency of users an average of 50 percent. Landauer also found that productivity in the service sector was depressed by 2 to 4 percent annually because of bad software design. And a study by The Standish Group International Inc. [of Dennis, Mass.] shows that more than 30 percent of software development projects are canceled before they are completed, often because they are not well-conceived from the outset. The result of wasted development time adds up to a loss of about \$80 billion annually. Other studies show that for every dollar spent on user-centered design, you gain back between \$2 and \$100 in increased revenues or reduced costs, depending on the type of application. In fact, every study I've seen indicates that taking a user-centered design approach is always a winning situation.

So poor usability has major implications for the ultimate effectiveness of information technology.

You only have to walk the halls of a corporation and talk to people to see the frustration and anger that they feel over the issue of usability. There's often enormous hostility toward the IS department as a result. One of the goals of Lucid Computing is to help the CIO and the IS department become much more strategic and customer service oriented by integrating user-centered design methodologies into the software development process.

How should the IS department be restructured to become more customer-centered and strategic?

That's the million-dollar question. IS departments have to look at their

missions and how they fit into the strategic direction of their corporations. Many of the new corporations that have a decentralized structure get an enormous payoff from having a customer-centered approach. The payoff may be less in a highly centralized organization, in which the key strategic element consists of squeezing every last penny out of processes such as manufacturing. There's also an issue of sensitivity. You have to educate your own programmers, systems analysts and software engineers to understand that users are not excess baggage, that serving them is the goal. Everyone struggles with software development. The programmers and engineers have to realize that often they get a professional payoff from the struggle because, at the end of a project, they can say that they've increased their skill set. However, the struggle that users go through is completely debilitating in that it doesn't lead them to professional growth. The software engineers who do become interested in user-centered design have to be nurtured. Certainly, tying a project manager's compensation to customer satisfaction is a start.

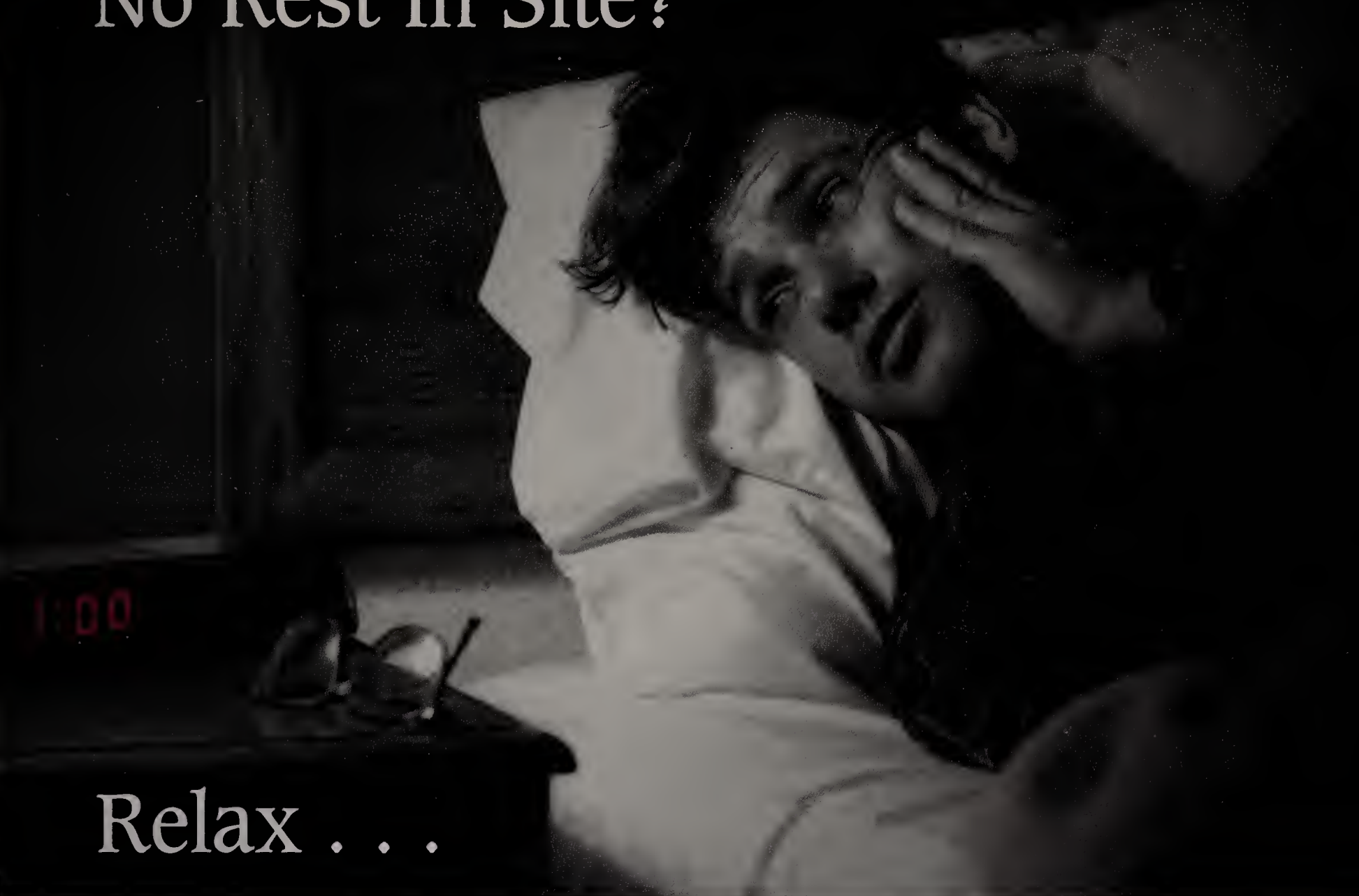
What are the key skills developers need in order to be good usability engineers?

Usability engineers need to understand something about how human beings learn and solve problems [and] something about business process so that they can analyze the software component of that process and design the software to fit it. Visual design skills are helpful for developing screens and navigation tools. And surprisingly, usability engineers need good technical skills. At the minimum, they have to understand how programming is done and be able to communicate effectively with programmers because very often the design of the front-end interface is constrained by technical considerations on the back-end side.

You mentioned navigation skills, which brings to mind the Web. Will the Internet increase the need for developing user-friendly applications?

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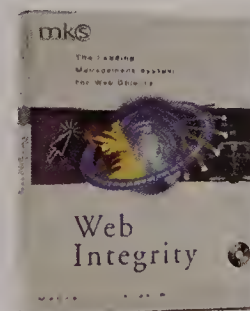
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of the computer being a mass communications medium when software has usability problems. It's amazing to me how many Web sites are difficult to navigate. Corporations developing outreach programs

his or her business process. CIOs should be educating users, and they have to start by defining what skills they expect users to have. Then CIOs have to help users acquire those skills. And by users, I'm also talking

lots of clients. The issue here is that Net-centric computing has to be done so that users don't become constrained and lose their opportunity to make computing tools work for them in a way that fits their work style.

It's impossible to conceive of the computer being a mass communications medium when software has usability problems.

for consumers or conducting commerce on the Web have to develop software that's easier to use.

With the year 2000 conversion problem, software is on the front burner at a lot of corporations. Can CIOs apply any year 2000 lessons to the issue of usability?

For one, we have to realize that software tends to stick around a lot longer than we ever think it will. Systems we built 25 years ago are still operating. As we develop software, we shouldn't underestimate its longevity. The other lesson is that legacy systems should be a major concern of the CIO. The year 2000 issue is a massive problem that is going to take a great deal of money and time to solve. And we now have a second class of legacy systems such as the client/server systems that were developed before the Net-centric model was in place.

Do legacy systems complicate usability concerns?

Legacy systems do constrain user-centered design because you can't just wipe them out and start all over. They need to be modified in an iterative, progressive fashion.

Do business people still need to learn about the inherent complexity of IT?

Absolutely. The responsibility for Lucid Computing lies on both the business and IT sides. End users should be what I call computer competent, depending on their relationship with software development. For example, someone who just uses word processing needs a very different set of skills from that of a project manager who is participating in the design of software that will affect

about strategic managers and executives, who in many cases are not tremendously adept with technology. It's their lack of understanding of the complexity of software that CIOs should be most concerned about; it can lead them to take Draconian and ill-advised measures in terms of cutting budgets and creating unrealistic schedules that can really challenge quality control.

You mentioned the Net-centric computing model earlier. How will network computing affect software development?

Many users feel they have fought long and hard to get autonomy from what they have perceived to be the iron fist of the IS department. They feel that the move to thin clients and Net-centric computing is a serious risk for them because now the IS department is going to take over computing again. They're no longer going to be able to configure and control their environment. Net-centric computing is, in many ways, a far superior model to a distributed client/server environment where the IS people have to maintain

Find It Online

For more information on the Lucid Computing movement, visit www.cognetics.com/lucid.

For more information on Thomas K. Landauer's book *The Trouble with Computers: Usefulness, Usability and Productivity*, visit www.mitpress.mit.edu/index.html.

For detailed statistics from The Standish Group, visit www.standishgroup.com and click on the Chaos link.

What can CIOs do about usability when it comes to off-the-shelf software?

When CIOs buy complete packages, they should make usability a key factor. When CIOs develop software, they will probably incorporate purchased components. The concept of using component-based software is a very good one, but there are some serious risks related to componentware. Because a component has to be sold to many different corporations for use in many different environments, the designers of that kind of software are always going to opt for the most general and flexible environment. From the user's perspective, that may be very challenging. Also, the integration of different components can create inconsistencies in the overall application design. For example, components may have slightly different objects, ways of dealing with the screen, different wording and types of controls, and so forth. In some ways, in a component-based development environment, it's really necessary to carefully design the front end. One element CIOs should look for is total flexibility, through APIs [application program interfaces], for example, so that designers can create a front end for the various components. I've seen bad examples where developers have put components together and created very clunky operating environments.

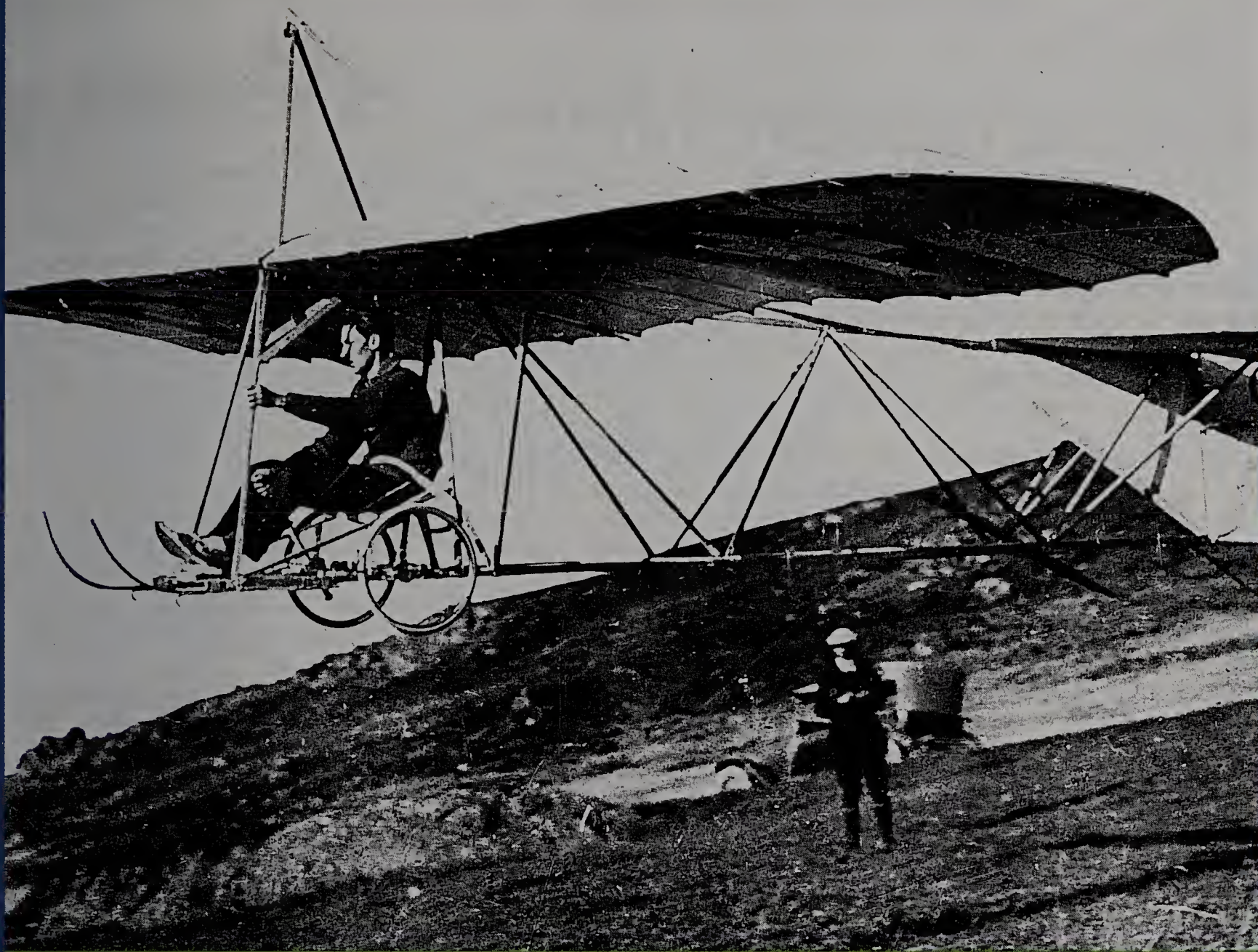
Sounds like software vendors could also benefit from user-centered design techniques.

Everyone involved with software can benefit. User-centered design will not solve 100 percent of software problems, but it will solve a lot of them. At the very least, user-centered design identifies the goal for software in terms of what it's going to do and how the users are going to use it. The complexity is reduced enormously. **CIO**

Associate Editor Megan Santosus can be reached at santosus@cio.com.

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LESSONS LEARNED FROM PEOPLE IN THE KNOW

Timing Is Everything

Seizing the perfect moment to present a new technology to your company can make or break a strategic plan

BY ALBERT AIELLO JR.

NEW TECHNOLOGY IS arriving at a dizzying rate and cannot be ignored. But knowing when to introduce a new technology is no mean feat. Presenting it too early without an appropriate strategy or too late with or without a strategy could cost you your job. But how does a CIO know when a new technology should be introduced?

To answer this question, it is important to understand the role of new technology in the competitive success of your business. Is technology the key

to differentiating your business from your competitors? Is your company known for technological innovation? If you answered yes to these questions, your business may be or may want to be a technology leader. For example, Fidelity's 401(k) business has consistently differentiated itself from its competitors by being the first to offer new technology enhancements and platforms, such as self-directed trading, Internet access and voice-response units. That advantageous position requires the relentless delivery of new technology enhancements as quickly

as the underlying infrastructure can support them.

Follow the Leader

For other companies, the business strategy may be to introduce a new technology shortly after the industry leaders do. For those companies, which might be called technology followers, the objective is to mitigate the risk and cost of being the first to introduce a new technology while capturing—or at least not losing—a share of profits generated by it. In essence, the aggressive follower balances the costs of being too soon (introducing unproven technology that could be a potential dead end; proceeding without the necessary implementation expertise, etc.) against those incurred by being too late.

Companies in industries where technology is not important in differentiating one competitor from another can afford to be late adopters or laggards. Oftentimes, the product itself may not be differentiated easily from others (for example, when it is a commodity). Under those circumstances, technology's principal objective may be seen only as a way to reduce costs.

However, today there are fewer industries and companies where technology is not a differentiator. In those few cases where it's not, that perception may be the result of a lack of creativity on the part of business leaders.

The financial services industry currently is wrestling with the timing of the use of monetary transactions on the Internet. Several technology leaders have implemented new technology encryption and certifying authority capabilities for retail customer monetary transactions. Others are waiting to see how it will all shake out, thereby forgoing initial market share. Some late followers, those who might be called laggards on the technology adoption curve, are just beginning to develop their own Web sites.



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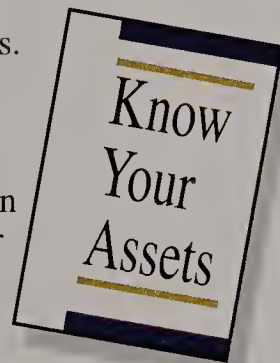
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For example, health care has delayed Web development because of patient privacy concerns, which makes sense. The insurance industry has also been slow to adopt Web technology, although in this case, I don't agree with that strategy.

Variety Prevails

In a large organization with many products and services, a variety of technology strategies may prevail. Some groups may be leaders, others followers and still others late adopters at different points in time. For any organization, however, whether large with a variety of technology strategies or small with a single strategy, a continual evaluation of each strategy must occur. As business conditions change, for example if the industry matures or a new technology is brought to market, a CIO must reconsider his or her position as leader, follower or cost-reduction implementer and act accordingly. For example, a company that wants to reposition itself from follower to leader may need to increase the size of its advanced technology group or invest in training the staff in the new technology.

In the 1980s, Frito Lay Inc. introduced its now-classic inventory-replenishment system by employing new handheld computing technology. The application allowed Frito Lay to differentiate itself from other snack companies in service to its grocery store customers and to reposition itself as a technology leader.

Conquer the Curve

Unless a CIO understands and recognizes where his or her company resides on the technology adoption curve and acts accordingly, a technology-follower strategy easily could become one of a laggard—especially if the CIO and other managers try to minimize their own individual risk by avoiding the tough adoption decisions. When this happens, a company whose customer services are based on being a leader or aggressive follower may see its market share or profits slip away. Customers who have come to expect the best service or a continuous stream of new products through technology may see this change and start to look elsewhere as a company slips from leader to follower to laggard.

Creative management can turn a technology follower into a leader, and while

the risks of sliding down the scale are great, opportunity may be had in moving up. For example, a hospital in the Boston area not well known for its technology suddenly has begun featuring technology as a selling point in its advertisements. If that push is successful, the hospital may position itself as a technology leader in the public's mind. As long as management backs up the claim with an early-adoption strategy, the hospital will increase its differentiation among the region's numerous health-care providers.

Growing Pains

Besides knowing where your business fits on the technology adoption curve, CIOs need to master the skills for properly timing technology adoption. When first introduced, a new technology can be viewed as being on the bleeding or leading edge. If adopted at this time, questions will arise: Will it work as planned? Are our schedules and budgets accurate? Will this project be a shortcut to disaster? This leads to the question, "Why would a company want to be a

As a technology matures, it moves into the leading or mainstream phase, which is characterized by widespread adoption and moderate risks. At this stage, companies have higher success rates hiring IT staff familiar with the technology rather than training people from scratch. The aggressive followers sign on quickly so as not to be left behind. If their timing is right—when the risks are moderate, the technology's direction is clear and few companies have yet to implement it—aggressive followers can reap significant benefits. For example, commercial applications of voice recognition and massively parallel processing have significant customer service potential, and leaders and aggressive followers currently are using those technologies in new applications.

Successful technologies eventually slip into the mainstream or legacy phase. Unix might be one such example. In this phase, the technology's business benefits are clear from the examples of the leaders and followers that have adopted it. In companies for which technology has

Companies in industries where technology is not important in differentiating one competitor from another can afford to be late adopters or laggards.

technology leader and expose itself to leading-edge technologies and the risks and costs associated with them? The answer is simple: In an industry where technology differentiates (or where customers can be convinced it differentiates), the lion's share of the growth and profits of innovation go to the leader.

Useful techniques to mitigate but not eliminate the risk of early adoption include prototypes, contingency plans, extreme testing and vendor partnerships. Partnerships spread the risk and accountability between customer and vendor. That can make way for customization, modification and training, elements that could mean the difference between success and failure. The further out you are on the leading edge, the sharper these skills must be and the more important it becomes to have strong management buy-in. Technology leaders must master managing this part of the maturity curve if they are to succeed.

little strategic significance, the clear benefits and minimal risks make the timing right for adoption. The company would not need to pursue vendor partnerships or extreme testing; it could spend its time negotiating a good price.

Wherever you are on the adoption curve and whatever strategies you use to maintain your position there, you must master those strategies to be successful. Technology leaders must learn or continue to master how to successfully implement leading-edge technologies. If you don't, your success as a leader will be short-lived. Until you have both the business strategy and the appropriate expertise, you are not ready to introduce a new technology. **CIO**

Albert Aiello Jr. is president of Open Print Server/Intelligent Document Factory and former CIO at Fidelity Investments in Boston. He welcomes comments at al.aiello@fmr.com.

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Emerging Technology

THE STATE OF THE ART,
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OF THE CURVE

Edited by Elaine M. Cummings

Windows NT Scalability

Is NT ready for prime time?

BY JOHN EDWARDS

MICROSOFT HAS SPOKEN. The software giant has declared Windows NT ready for the enterprise. Still, you can't blame CIOs if they proceed with caution as the software giant plans to conquer the world of business-critical computing.

According to Microsoft Corp., Windows NT 4.0 will provide the raw power to serve 1 billion transactions per day, handle 100 million daily Web hits and support 1-terabyte databases. "Any business of any size can now run its enterprise applications on Microsoft software and industry-standard hardware," promised Chairman and CEO Bill Gates at Microsoft's massively hyped "Scalability Day" in New York last May. Yet, despite Microsoft's substantial claims, many IT experts question NT's ability to cope instantly with the enormous challenges of enterprise computing.

NT is only partially primed to tackle the enterprise, says Glyn Meek, chief operating officer of PSA/Pencom Systems Administration, a national systems administration consulting firm based in Austin, Texas. "NT is ready for use in intranet applications, for desktop support services or handling e-mail and file sharing, but it's not yet ready to handle high-end transaction needs," he says.

Microsoft inflated NT's transaction-handling powers on Scalability Day by demonstrating the product's capabilities on a test system that took several months to create and debug. Furthermore, the company didn't orga-

nize the machines into a cluster—at least in the way the term is usually defined. Instead, it divided its test database into segments, each managed by a separate NT server. Notes Meek, "It wasn't exactly a real-world test."

Joseph Amaral, a manager with Coopers & Lybrand Consulting in Burlington, Mass., also says that NT isn't quite ready to handle all types



of enterprisewide computing, but CIOs won't have to wait long before NT becomes a safe and attractive alternative to Unix and Novell Inc. NetWare platforms as well as to mainframe environments. "We're just at the starting gate," he observes. "At this point, NT doesn't scale as well as the competition, but in six months the situation should be a lot firmer."

Despite the hype, Scalability Day served as a wake-up call for CIOs, says Ken Rudin, CEO of Emergent Corp., a systems integrator based in San Mateo, Calif. "The event was designed to show NT's future direction and Microsoft's blueprint for embracing scalability. I'm not even sure that they were seriously trying to convince people that NT is ready for scalability today. They were saying, 'Buy today and we'll meet your needs as you grow.'"

Several new or enhanced tools are on the way to help Microsoft's high-end operating system handle business-critical enterprise applications. According to Amaral, a key to NT's future scalability success is Microsoft's

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upcoming Wolfpack clustering technology, due out in the fourth quarter as a part of Windows NT 4.0 Enterprise Edition. A second, enhanced version of Wolfpack, which will provide multiple-node clustering and some load-balancing capabilities between servers, is scheduled for release next year. "Wolfpack will help NT meet Microsoft's performance promises," says Rudin. "Without advanced clustering capabilities, NT is dead in the water as a scalable product."

Also on the horizon is an improved version of the Structured Query Language (SQL) Server database management system. The current interim version, SQL Server 6.5/E, supports up to eight processors along with 3GB of application memory and 300GB of data. But a greatly improved version—code-named Sphinx—is due out by early 1998. Sphinx features a 1-terabyte database as well as integrated online analytical processing, multimaster replication, user-defined functions, dynamic locking and the ability to handle complex data. "To say that Sphinx will be a major improvement over the current version of SQL Server is to understate the situation," asserts Amaral. "Sphinx will mark a major step forward in NT scalability, making it suitable for really high-end applications."

Although enterprise-oriented NT applications will be in short supply for the foreseeable future, vendors are starting to recognize NT's potential power and have begun directing their new product initiatives toward the technology, says Douglas Tuttle, national director of high-technology consulting for the Deloitte & Touche Consulting Group, whose global office is in New York. "Both SAP AG and PeopleSoft, for example, are using NT platforms for 45 to 50 percent of their new implementations," he says. "A lot of the major Unix vendors are doing a total 360 degree shift. They're actually limiting their Unix development and migrating to NT."

But finding workers skilled in NT and its applications and tools is shaping up to be a major problem facing the technology's initial adopters. "We're constantly looking for people with NT skills, although we're hoping the shortage will

Prêt à Porter?

Wearable computers are off the drawing board but not yet off the rack

YOU'LL PROBABLY NEVER SEE Cindy Crawford strutting down the catwalk in one, but wearable computers are more than a high-tech fashion statement. Lightweight, compact body-mounted systems—featuring advanced display and voice-recognition technologies—were pioneered by the military to create hands-free computers for

user with access to Windows 95 via verbal commands. Prices start at about \$5,000.

According to Covin, smaller displays, miniaturized components, more reliable voice recognition tools and reduced power requirements combine to make wearable computers more practical and affordable. "I think we're just at the threshold of the technology's ultimate potential," she says.

But David Yarowsky, an assistant professor of computer science at Johns Hopkins University's Center for Language and Speech Processing, says wearable computers will move out of niche markets and into the computer mainstream only when high-quality voice recognition becomes widely available. "Right

WEARABLE COMPUTERS

use in the field. The concept is now finding a home in occupations where carrying a computer is either inconvenient or impossible.

Xybernaut Corp., which began life marketing wearable computers to the military, is now selling systems to companies interested in boosting worker productivity in a wide array of industrial activities, including maintenance, inspection, inventory control and data collection. "We're also beginning to receive interest from the medical community," observes Carol Covin, a marketing representative with the Fairfax, Va., company. "Surgeons, for example, can use a wearable computer to examine a series of X-rays during an operation without having to rely on a runner to retrieve and deliver the images."

Xybernaut's latest wearable PC, the Mobile Assistant II, combines an Advanced Micro Devices 133MHz 586 processor, 8MB to 32MB of enhanced data output RAM, a 2GB hard drive and a pair of PCMCIA slots into a device that clips onto the user's belt. A 15-ounce head-mounted display, with a 640- by 480-pixel monochrome resolution, is suspended in front of one eye, giving the user a Star Trek Borg-like appearance. A microphone, integrated into the display, works with voice recognition software to provide the

now, while users can issue simple interface commands with a high degree of accuracy, entering spoken information into word processors and other applications remains a tedious and unreliable chore."

Yarowsky notes that mediocre dictation-class voice recognition capabilities will limit wearable computers to workers performing narrowly defined tasks for at least a few more years. "It will be awhile before we begin seeing people wearing a computer in the same fashion as a Walkman," he says. —J. Edwards



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abate as more organizations begin to deploy NT systems," notes Pencom's Meek. Tuttle agrees that the NT worker shortage is acute: "Right now, it's very difficult to find Microsoft-certified system engineers. They're gold in the marketplace."

Despite NT's short-term drawbacks, many industry observers feel the technology will eventually offer adopters significant advantages over competing systems, particularly in the areas of system administration and cost. Amaral notes that NT will simplify the management of system groups and their applications by allowing the administrator to manage an entire group as a single system. "One of NT's current shortcomings is the lack of a universal directory structure, but Microsoft is set to remedy that problem when it releases Active Directory in NT 5.0, probably in early 1998. When that day arrives, NT will be much easier to administer than Unix, NetWare or a mainframe."

Many organizations are closely examining NT for its potential cost benefits. Tuttle maintains that NT is indeed a cost-effective enterprise technology, particularly when compared with Unix. "In a recent survey, we found that NT platforms came out clear winners in total cost of ownership in areas from low- to high-end servers." Tuttle notes that Unix support software is much more expensive than comparable NT products, and Unix-skilled developers and administrators also command higher salaries than their NT-savvy counterparts despite the current shortage of NT professionals.

But according to Meek, NT's potential cost-saving benefits have been blown out of proportion. The notion that NT can slash expenses is a "little naive, in the same way that one might have expected a client/server installation to be cheaper than a mainframe environment." NT and Unix will compete with each other primarily on the basis of functionality and reliability, not total cost of ownership, says Meek. "If you look at the cost of all the components in an enterprise system, the server operating system is a minor part of that. While NT may be a little cheaper, it's a minor part of the equation."

While some CIOs, swayed by the claims of Microsoft and its supporters, may be tempted to jump immediately on the NT bandwagon for business-critical applications across the enterprise, Rudin urges patience. "CIOs are entering uncharted waters, so there's a need to be cautious." Rudin suggests that it's "probably safe" to switch systems with four to eight processors to NT right now: "I'm a little less positive about larger NT clusters. I think we'll have to wait a few years before we know how well NT works in that environment."

NT is guaranteed an important place within enterprise computing, admits Mark Silverberg,

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chairman of the Unix Systems Cooperative Promotion Group, a consortium of major Unix hardware and software vendors. But he adds that CIOs should wait until the dust has settled before making any move toward the product. "Potential adopters may be attracted by Microsoft's promises, but NT's real value on the enterprise level can be assessed only once it has established a track record that can be examined," he says.

NT is simply too new to entrust with critical applications, agrees Meek. "There's a gut feeling among many managers that NT just hasn't been around long enough to establish a track record in terms of reliability," he says. "Even Microsoft, with all its coders, can't eliminate all the bugs that are likely to crop up in a product of this type in such a short period of time. Early adopters are likely to find themselves playing the

role of guinea pigs as Microsoft works out all the bugs."

Meek recommends that organizations looking to adopt NT for critical applications take a gradual, step-by-step approach toward total adoption. "As in the early days of client/server systems, it's a good idea to evaluate NT with small, non-critical trial projects," he says. "That way, the damage is limited to a self-contained area if something goes dramatically wrong."

"NT's real value can be assessed only once it has established a track record that can be examined."

—Mark Silverberg

Rudin suggests that managers responsible for data warehouses sample NT technology with data marts—smaller systems that extract information from a warehouse for analysis by relatively small groups of users. "In that application, NT offers a better price point and a better user interface than Unix. Later, when NT is able to support a data warehouse, the manager will have the necessary knowledge and experience to make the changeover with a minimum amount of trouble and anxiety."

Despite the threat posed by NT, Silverberg notes that Unix, as a stable, mature platform, still has plenty going for it. He believes that the environment offers CIOs a "deeper, richer base of applications and support tools" than Windows NT. "Unix has a scalability heritage that's been built up over many years to encompass everything from notebooks to workstations to servers. Also, as we've seen with mainframes, environments don't fade away overnight, so Unix will be a force in the market for many years to come." Silverberg adds that CIOs should also remember that Unix isn't standing still. "It's going to continue to evolve in response to the challenges presented by NT."

According to Silverberg, Unix also offers advantages that may not be immediately apparent to many CIOs. "Scalability is important across a number of dimensions, including the components within a system, such as the I/O and storage capabilities. Unix has traditionally been strong in these areas and will continue to be very energetic."

Nonetheless, while Unix, NetWare and mainframe environments will all be key parts of the enterprise landscape well into the 21st century, most industry observers expect a relent-

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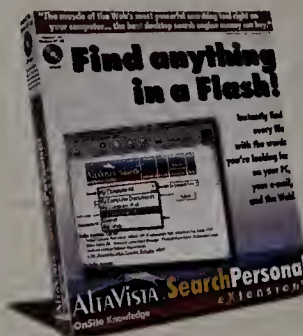
High-Profile Data

SOME CIOs LOOK TO GET THEIR CLIENT COMPUTERS so thin that they might rival international supermodels. Those Internet browsers that cavort happily through life not caring a whit for platforms make extranets possible, and they keep those clients downright skeletal. But if you had information locked away in data marts, data warehouses or other databases, it has been tricky to get the data out to an intranet where your sales force or human resources people could use it. Search engines solve this problem for text data, but they have been blind to the contents of a database.

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less move toward NT. And as NetWare and mainframe systems gradually fade into history, the scalability battle will be fought primarily between Unix and NT. "Microsoft is going to put everything in the world into NT. Without the single-minded commitment of a focused supporter, Unix will have to struggle to keep pace," Rudin says. And while NT is behind right now, it's on a steeper upward curve, he adds: "NT will overtake Unix, that's certain, but it will take many years."

By adding scalability to NT, Microsoft has created a steamroller that's ready to flatten the competition, says Coopers & Lybrand's Amaral. "In the years ahead, I see NT everywhere," he says. "As soon as Microsoft can get NT to hit 100,000 users in a clustered environment with fault tolerance, then NT is going to be the platform of choice." **CIO**

John Edwards is a freelance technology writer based in Mount Laurel, N.J. He can be reached via e-mail at 70007.412@compuserve.com.



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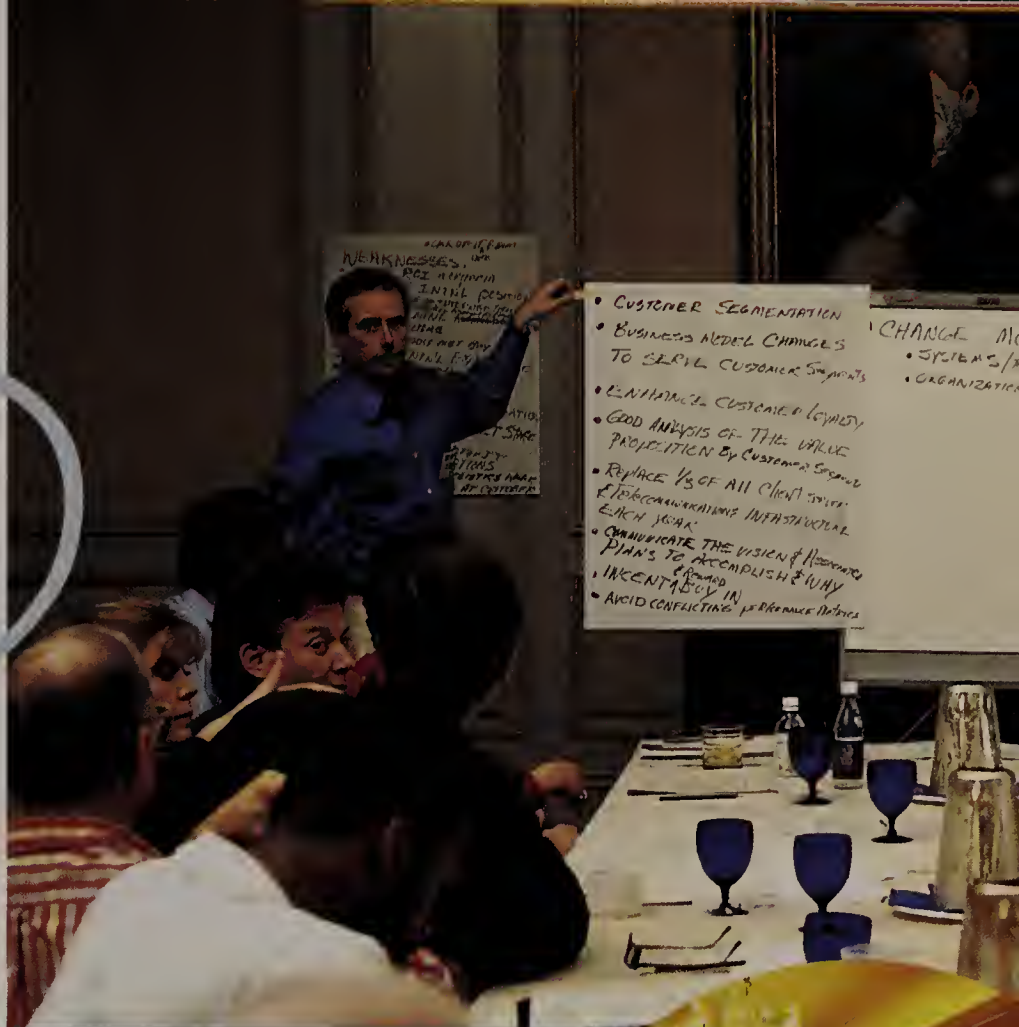
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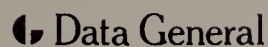
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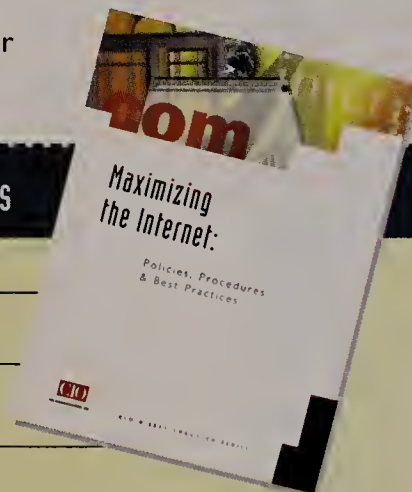
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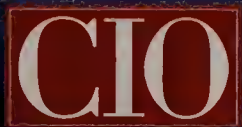
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Working Smart

MAXIMIZING THE PAYOFF FROM I.T.

IN THE RETAIL INDUSTRY, SUCCESS IS determined by an ability to mix the art of knowing what consumers want with the science of managing inventory. At Recreational Equipment Inc. (REI), a chain of outdoor stores based in Kent, Wash., picking the right selection of camping equipment and related gear is still decided by product managers, not computers. But packaged software applications have taken much of the guesswork out of stocking and managing inventory effectively. Not only is the company more efficient, but it has achieved the enviable goal of increasing sales while trimming inventory levels.

Inventory management at REI was once a largely manual process. Analysts at corporate headquarters collected sales figures from individual stores located around the country and painstakingly compared the figures with the sales plan. But with tens of thousands of products and dozens of stores, analysts couldn't possibly sift through all the data in a timely manner. "We generally were looking only for exceptions because that's all we could handle," recalls Dan McBroom, REI's project manager for inventory systems. As a result, analysts could spot problems after the fact, but they were ill-equipped to proactively spot trends and manage inventory accordingly.

By 1994, REI decided to automate. "We wanted to improve efficiency and get a better sense of what we did and did not need to order," says McBroom. The first phase of the company's approach was to implement a purchasing application called E3Trim from E3 Associates Ltd. in Atlanta. The software, which is installed on an IBM AS/400, gives analysts a more accurate and comprehen-

sive look at what's selling at individual stores. From their LAN-based desktops, analysts use the software to check the status of orders due from vendors on a day-to-day basis. The system tracks what's on order and what's currently in

REI's Automated Inventory System

Vital Statistics:

- **Organization:** Recreational Equipment Inc. (REI), Kent, Wash.
- **Application:** Inventory management system
- **Technologies:** E3 Associates' E3Trim purchasing software and E3Slim distribution software running on an IBM AS/400; a local area network of IBM-compatible PCs
- **Scope:** 20 inventory and distribution analysts working at corporate headquarters
- **Sponsor:** Mike Boshart, director of merchandise planning
- **Objective:** Improve efficiency within inventory management
- **Payoff:** Increased sales of camping equipment by 3 percent while decreasing inventory by 14 percent; enables analysts to do scenario planning

stock at the distribution center, and it automatically prompts the user to look at anomalous results from comparisons of the actual and anticipated sales figures for 41,000 separate items. Each night, the computer runs the figures in batch mode and comes up with an ordering recommendation. An analyst modifies or accepts the order, which is then faxed to the vendor.

Having sales and inventory information available quickly has allowed REI to reduce its ordering cycle from one

month to 14 days, says McBroom.

In 1996, REI completed part two of its phased approach to automation by implementing E3Slim, a complementary packaged product that handles distribution and replenishment of inventory at the store level. "All told, 20 inventory and distribution analysts use the two systems for total inventory management," says McBroom.

The systems have proved particularly useful for doing scenario planning. When vendors offer discounts, REI analysts now run scenarios factoring in all associated costs such as those for distribution, pricing and stocking. The analysts use the data projections to calculate the number of additional items to buy. For example, REI might normally buy

100 units of a particular product each week. If the vendor offered a 10 percent discount, analysts can factor in the additional carrying costs of buying extra units and compare that with the discount. "These systems really tell us how much forward-buying we should do and enable us to take advantage of economies of scale," McBroom explains.

Although REI won't reveal precise sales figures, McBroom says sales within the camping department, which make up "the heart of the company,"

went up 3 percent during the 1994-96 time frame, while inventory dropped 14 percent. "Inventory is one of the largest expense categories for a company," says Mike Boshart, director of merchandise planning. "[The systems] help us manage it more efficiently, and that lets us drive costs out of our supply chain."

—Megan Santosus

Send Working Smart ideas to Associate Editor Megan Santosus at santosus@cio.com.

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